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FEATURES

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The future of markup languages
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FIRST TAKE

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WORKSHOP

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- Sharing your Internet connection
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- Plus Mac OS, Linux, Java, C++ and more

ON THIS MONTH'S TRIPLE CD

- **Desktop enhancements**
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Australian Personal Computer

AUSTRALIA'S LEADING COMPUTER MAGAZINE

December 1999 \$8.95

ISSN - 0725-4415 NZ \$9.95 INCL. GST

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ACP



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12

WISE (BUSINESS) MEN BUY FROM DELL

Featured Product is the Dell Dimension® L Series photographed with optional features, 17" flat panel monitor and Altec Lansing ADA880 Digital Surround Sound Speakers with Subwoofer (Subwoofer not pictured).

You make difficult business decisions every day. So, here's an easy one. Dell can help guide your business into the New Year. In fact, you can probably afford to upgrade the entire office before Christmas. The Dell Dimension® L Series of desktop systems start from as low as \$1,549*. And they're packed with smart technology too - many of our PCs offer the latest Intel® Pentium® III processors up to 700MHz. The Dell Dimension® L series all feature a minimum 4.3GB* hard drive, plus the entire Dell Dimension® range offer 3 year limited warranty* and lifetime telephone technical support. You can be sure that you are making the right decision with Dell, winner of Australian Personal Computer's Reader's Choice Award for PC service and reliability. That's just one of the reasons Dell is now the number 2 PC company in the world*. Like to know more? **Make the wise business decision this Christmas and call Dell on 1300 303 107, or visit www.dell.com.au**

CHRISTMAS DEALS FROM DELL


DELL DIMENSION® XPS T600 DESKTOP INTEL® PENTIUM® III PROCESSOR 600MHz

- Mini Tower Model
- 512KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 13.6GB* Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- Turtle Beach Montego II 320Voice PCI Sound Card
- 48X Max* Variable CD-ROM Drive
- Altec Lansing ACS-340 Speakers with Subwoofer
- **19" Colour Monitor (17.9" v.i.s.)**
- **Sony CD RW**
- Microsoft® Intellimouse
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- McAfee Virus Scan
- 3Com® US Robotics 56K PCI Voice Fax modem for Windows
- Dell QuietKey Keyboard
- **HP DeskJet 610C Colour Printer**
- **HP ScanJet 3200C Scanner**
- 3-Year Limited Warranty
- **Free Lifetime Telephone Technical Support**

\$3,999* plus delivery

\$33 per week**

Upgrade to:
• 20.4GB* Ultra ATA Hard Drive \$150
• Altec Lansing ADA 880 Speakers w/subwoofer \$234

 **E-VALUE CODE 211117X-470311**


DELL DIMENSION® L466C DESKTOP INTEL® CELERON® PROCESSOR 466MHz

- Micro Tower Model
- 128KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 6.4GB* Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- Integrated Direct AGP 4MB Dynamic Video Memory
- Creative Labs SoundBlaster 64Voice PCI Sound Card
- 40X Max* Variable CD-ROM Drive
- Harmon Kardon HK195 Speakers
- **17" Colour Monitor (15.9" v.i.s.)**
- **Logitech 4-button MouseMan® Wheel (PS/2)**
- **Lexmark 1100 Colour Jetprinter**
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- McAfee Virus Scan
- 3Com® US Robotics 56K PCI Voice Fax modem for Windows
- Dell QuietKey Keyboard
- 3-Year Limited Warranty
- **Free Lifetime Telephone Technical Support**

\$1,999* plus delivery

\$17 per week**

Upgrade to:
• 13.6GB* Ultra ATA Hard Drive \$93
• Microsoft OEM Office 2000 Small Business Edition \$181

 **E-VALUE CODE 211109X-470311**


DELL DIMENSION® L433C DESKTOP INTEL® CELERON® PROCESSOR 433MHz

- Micro Tower Model
- 128KB Integrated L2 Cache
- 32MB 100MHz SDRAM
- 4.3GB* Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- Integrated Intel 10/100 PCI Ethernet Controller
- Integrated Direct AGP 4MB Dynamic Video Memory
- Integrated Creative Labs 64 Voice Sound
- 40X Max* Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Intellimouse™
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- McAfee Virus Scan
- Dell QuietKey Keyboard
- 3-Year Limited Warranty
- **Free Lifetime Telephone Technical Support**

\$1,549* plus delivery

\$13 per week**

Upgrade to:
• 17" Colour Monitor (15.9" v.i.s.) \$187
• Microsoft® OEM Office 2000 Small Business Edition \$181
• Add Iomega Zip 100MB Internal Drive \$140

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FOR SERVICE AND RELIABILITY - JULY 99**



HP DESKJET 610C

- Print everything from creative projects to home finances
- Crisp black text using pigment ink, and vibrant colour printing
- Up to 50ppm black and 2.5ppm colour printing speed

\$239



HP SCANJET 3300C

- Easy set up and fast operation with USB
- 36bit colour, 600 dpi optical and 9600 dpi enhanced resolution
- FREE HP PrecisionScan LT scanning software
- Fully automated Optical Character recognition (OCR) capability
- FREE HP Copy Utility & Adobe PhotoDeluxe Home Edition

\$245

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DELD0194/APC/Front

THIS CHRISTMAS WE COME

Dell has pioneered the direct way of manufacturing and selling PCs, and it's seen us become the number 2 PC company in the world. We're sure you can appreciate that to achieve this level of success, you need more than just exceptional prices. Here are 5 more good reasons:

1. WE BUILD TO YOUR SPECIFICATIONS.

Dell doesn't keep a stockpile of systems – we build to order. By providing this custom configuration, your exact requirements are integrated during the manufacturing process, saving you time and helping to reduce your total cost of ownership. Plus it means your Dell system arrives fully tested and ready to run.

2. DEAL DIRECT AND SAVE.

By dealing direct, we cut out retailer and middleman mark-ups. As a result, not only are these savings passed on to you in our great prices – it also means you can own our latest technology for less.

3. ORDERING ONLINE IS EASY.

Dell offers online customer access 24 hours a day, 7 days a week. Our website contains over 35,000 pages of technical information, including secure shopping, real-time pricing updates, product information

(with multimedia demonstrations), service and support options, order status reporting, trouble-shooting and a software library.

4. WE KEEP UP WITH THE LATEST TECHNOLOGY.

When we get your order, we're able to build your computer using the very latest technology we get our hands on. As a result, high quality products offering exceptional reliability and value for money are standard.

5. COMPLETE PEACE OF MIND.

All Dell products come with free telephone technical support for the lifetime of the system. So if a problem occurs (which would be rare), you can simply call Dell and talk to a member of our Tech Support team (Mon-Fri 8am-8pm, Sat 8am-5pm). They will either diagnose and fix your problem over the phone, or organise a service call.

DELL DIMENSION® DESKTOPS – SMALL BUSINESS SYSTEMS

COMMON FEATURES • Mini Tower Model • 3.5" 1.44MB Diskette Drive • McAfee Virus Scan • 3 Year Limited Warranty • Microsoft® Intellimouse™ • Dell QuietKey Keyboard

DELL DIMENSION® XPS T700R DESKTOP INTEL® PENTIUM® III PROCESSOR 700MHz


- 512KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 13.6GB Ultra ATA Hard Drive
- 3Com® Etherlink® 10/100 PCI NIC for Complete PC Management
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- Integrated Yamaha 64Voice Wavetable Sound
- 48X Max® Variable CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® Windows NT® 4.0
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$3,679* plus delivery

\$31 per week**

- Upgrade to:
- 20.4GB Ultra ATA Hard Drive (7,200rpm) \$150
 - 8X Max® Variable DVD-ROM Drive and Software Decoding \$84
 - 15" Flat Panel Monitor (15.0" v.i.s.) \$1449
 - Add Sony CD-RW with Formatted Media \$374

 E-VALUE CODE 221119-470311

DELL DIMENSION® XPS T550 DESKTOP INTEL® PENTIUM® III PROCESSOR 550MHz


- 512KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 6.4GB Ultra ATA Hard Drive
- 3Com® Etherlink® 10/100 PCI NIC for Complete PC Management
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- 48X Max® Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$2,399* plus delivery

\$20 per week**

- Upgrade to:
- 13.6GB Ultra ATA Hard Drive (7,200rpm) \$131
 - 17" Colour Monitor (15.9" v.i.s.) \$187
 - Iomega Zip 250MB Internal Drive \$280
 - Add Sony CD-RW with Formatted Media \$374

 E-VALUE CODE 221113-470311

DELL DIMENSION® L500C DESKTOP INTEL® CELERON™ PROCESSOR 500MHz


- 128KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 6.4GB Ultra ATA Hard Drive
- Integrated Intel 10/100 PCI Ethernet Controller
- Integrated Direct AGP 4MB Dynamic Video Memory
- Integrated Creative Labs 64 Voice Sound
- 40X Max® Variable CD-ROM Drive
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Office 2000 Small Business Edition

• Free Lifetime Telephone Technical Support

\$2,229* plus delivery

\$19 per week**

- Upgrade to:
- 13.6GB Ultra ATA Hard Drive \$93
 - 19" Colour Monitor (17.9" v.i.s.) \$430
 - Harman Kardon HK195 Speakers \$52
 - Add Iomega Zip 250MB Internal Drive \$280

 E-VALUE CODE 221112-470311

DELL DIMENSION® XPS T500 DESKTOP INTEL® PENTIUM® III PROCESSOR 500MHz

- 512KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 6.4GB Ultra ATA Hard Drive
- 3Com® Etherlink® 10/100 PCI NIC for Complete PC Management
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- 48X Max® Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$2,099* plus delivery

\$18 per week**

- Upgrade to:
- 13.6GB Ultra ATA Hard Drive \$93
 - 17" Colour Monitor (15.9" v.i.s.) \$187
 - Iomega Zip 250MB Internal Drive \$280
 - Microsoft® OEM Office 2000 Small Business Edition \$181

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DELL DIMENSION® DESKTOPS – MULTIMEDIA SYSTEMS

COMMON FEATURES • 3.5" 1.44MB Diskette Drive • Microsoft® Windows® 98 Second Edition • McAfee Virus Scan • 3 Year Limited Warranty • Microsoft® Intellimouse™ • Dell QuietKey Keyboard

DELL DIMENSION® XPS T700R DESKTOP INTEL® PENTIUM® III PROCESSOR 700MHz


- Mini Tower Model
- 256KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 13.6GB Ultra ATA Hard Drive
- 16MB 3Dfx Voodoo 3000D AGP Graphics Card
- Turtle Beach Montego II 320Voice PCI Sound Card
- 48X Max® Variable CD-ROM Drive
- Altec Lansing ACS-340 Speakers with Subwoofer
- 17" Colour Monitor (15.9" v.i.s.)
- 3Com® US Robotics® 56K PCI Voice Fax modem for Windows
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$3,799* plus delivery

\$32 per week**

- Upgrade to:
- 20.4GB Ultra ATA Hard Drive (7,200rpm) \$150
 - 8X Max® Variable DVD-ROM Drive and Decoder Card with TV Out \$215
 - Altec Lansing ADA-880 Dolby® Digital Speakers with Subwoofer \$234
 - 17" Flat Panel Monitor (17.0" v.i.s.) \$3963

 E-VALUE CODE 211120-470311

DELL DIMENSION® XPS T600R DESKTOP INTEL® PENTIUM® III PROCESSOR 600MHz


- Mini Tower Model
- 256KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 13.6GB Ultra ATA Hard Drive
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- Turtle Beach Montego II 320Voice PCI Sound Card
- 48X Max® Variable CD-ROM Drive
- Altec Lansing ACS-340 Speakers with Subwoofer
- 17" Colour Monitor (15.9" v.i.s.)
- 3Com® US Robotics® 56K PCI Voice Fax modem for Windows
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$3,229* plus delivery

\$27 per week**

- Upgrade to:
- 20.4GB Ultra ATA Hard Drive (7,200rpm) \$150
 - 8X Max® Variable DVD-ROM Drive and Decoder Card with TV Out \$215
 - Altec Lansing ADA-880 Dolby® Digital Speakers with Subwoofer \$234
 - 15" Flat Panel Monitor (15.0" v.i.s.) \$1449

 E-VALUE CODE 211117-470311

DELL DIMENSION® XPS T500 DESKTOP INTEL® PENTIUM® III PROCESSOR 500MHz


- Mini Tower Model
- 512KB Integrated L2 Cache
- 64MB 100MHz SDRAM
- 6.4GB Ultra ATA Hard Drive
- 16MB 3Dfx Voodoo 3000D AGP Graphics Card
- Turtle Beach Montego II 320Voice PCI Sound Card
- 48X Max® Variable CD-ROM Drive
- Harman Kardon HK195 Speakers
- 17" Colour Monitor (15.9" v.i.s.)
- 3Com® US Robotics® 56K PCI Voice Fax modem for Windows
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$2,299* plus delivery

\$19 per week**

- Upgrade to:
- 13.6GB Ultra ATA Hard Drive (7,200rpm) \$131
 - 19" Colour Monitor (17.9" v.i.s.) \$430
 - 8X Max® Variable DVD-ROM Drive and Software Decoding \$84
 - Iomega Zip 250MB Internal Drive \$280

 E-VALUE CODE 211112A-470311

DELL DIMENSION® L433C DESKTOP INTEL® CELERON™ PROCESSOR 433MHz


- Micro Tower Model
- 128KB Integrated L2 Cache
- 32MB 100MHz SDRAM
- 4.3GB Ultra ATA Hard Drive
- Integrated Direct AGP 4MB Dynamic Video Memory
- Creative Labs SoundBlaster 64 Voice PCI Sound Card
- 40X Max® Variable CD-ROM Drive
- Harman Kardon HK195 Speakers
- 15" Colour Monitor (13.7" v.i.s.)
- 3Com® US Robotics® 56K PCI Voice Fax modem for Windows
- Microsoft® OEM Works Suite 99

• Free Lifetime Telephone Technical Support

\$1,579* plus delivery

\$13 per week**

- Upgrade to:
- 6.4GB Ultra ATA Hard Drive \$37
 - 17" Colour Monitor (15.9" v.i.s.) \$187
 - 8X Max® Variable DVD-ROM Drive and Software Decoding \$84
 - Altec Lansing ACS-340 Speakers with Subwoofer \$88

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COMMON FEATURES • 3.5" 1.44MB Diskette Drive • High-fidelity Audio SoundBlaster Compatible • 24X Max* Variable CD-ROM Drive

DELL® INSPIRON® 7500 R500YT NOTEBOOK INTEL® PENTIUM® III PROCESSOR 500MHz

- On-Die 256KB L2 Cache
- 128MB 100MHz SDRAM
- 18GB* Ultra ATA Hard Drive
- RealPort CardBus Ethernet 10/100 & Modem 56 (32Bit)
- 8MB ATI RAGE Mobility™-P 2X AGP Video Controller
- 15.4" SXGA TFT Display (1280x1024)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Office 2000 Small Business Edition
- 1 Year Limited Warranty (With International Warranty)
- **Free Lifetime Telephone Technical Support**

\$6,979*
plus delivery

\$56 per week**

FREE Second Battery
Offer valid until 16th December 1999

E-VALUE CODE 521137-470311

DELL® INSPIRON® 7500 C433LT INTEL® CELERON™ PROCESSOR 433MHz

- On-Die 128KB L2 Cache
- 64MB SDRAM
- 4.8GB* Ultra ATA Hard Drive
- 4MB ATI RAGE Mobility™-P 2X AGP Video Controller
- 15.0" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Internal 56k Modem
- 1 Year Limited Warranty (With International Warranty)
- **Free Lifetime Telephone Technical Support**

\$4,299*
plus delivery

\$36 per week**

Upgrade to:
• Add Iomega Click!™ PC Card Drive with 1 Click disk \$359
• Add HP 340 Portable Printer \$470

E-VALUE CODE 511122-470311

DELL® INSPIRON® 3700 – MAXIMUM MOBILITY NOTEBOOKS

COMMON FEATURES • 3.5" 1.44MB Diskette Drive • High-fidelity Audio SoundBlaster Compatible • 1 Year Limited Warranty • Microsoft® Windows® 98 Second Edition • 24X Max* Variable CD-ROM Drive

DELL® INSPIRON® 3700 R500GT NOTEBOOK INTEL® PENTIUM® III PROCESSOR 500MHz

- On-Die 256KB L2 Cache
- 128MB 100MHz SDRAM
- 18GB* Ultra ATA Hard Drive
- RealPort CardBus Ethernet 10/100 & Modem 56 (32Bit)
- 8MB ATI RAGE Mobility™-P 2X AGP Video Controller
- 14.1" XGA Colour TFT
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- **Free Lifetime Telephone Technical Support**

\$5,949*
plus delivery

\$50 per week**

FREE Second Battery
Offer valid until 16th December 1999

E-VALUE CODE 521131-470311

DELL® INSPIRON® 3700 C433ST INTEL® CELERON™ PROCESSOR 433MHz

- On-Die 128KB L2 Cache
- 32MB SDRAM
- 4.8GB* Ultra ATA Hard Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI RAGE Mobility™-P 2X AGP Video Controller
- 12.1" XGA Colour TFT Display
- Microsoft® OEM Works Suite 99
- Deluxe Carry Bag
- **Free Lifetime Telephone Technical Support**

\$3,369*
plus delivery

\$28 per week**

Upgrade to:
• 6X Max* Variable DVD-ROM Drive and MARGI Decoder Card \$467
• Add Iomega Click!™ PC Card Drive with 1 Click disk \$359

E-VALUE CODE 511117-470311

DELL® POWEREDGE® SERVERS

DELL® POWEREDGE® 2300 SERVER INTEL® PENTIUM® III PROCESSOR 500MHz (DUAL PROCESSOR CAPABLE)

- Rack-mount Capable Minitor (Midnight Grey)
- 128MB 100MHz SDRAM With ECC (Upgradeable to 2GB*)
- 9GB* LVD SCSI Hard Drive
- 512KB Internal L2 Cache
- 3.5" 1.44MB Diskette Drive
- Standard Intel® Pro 100+ NIC
- Dell® Mouse
- Integrated Ultra2/LVD and Ultra/Narrow SCSI Controllers
- 40X Max* Variable SCSI CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Standard Openview Network Node Manager S.E.
- 3 Year Limited Warranty
(With 1 Year Next Business Day On-Site Service)***
- **Free Lifetime Telephone Technical Support**

\$4,729*
plus delivery

\$38 per month**

- Upgrade Options:
- Additional 2nd Intel® Pentium® III processor 500MHz \$1,215
 - Additional 9GB* LVD SCSI Hard Drive \$748
 - Novell Netware® 5.0 or MS Windows NT® Server 4.0*
 - Dell CriticalCare® 4-Hour On-Site Response from 1st to 5th year* (call for latest prices)

E-VALUE CODE 421125-470311

DELL® POWEREDGE® 1300 SERVER INTEL® PENTIUM® III PROCESSOR 450MHz (DUAL PROCESSOR CAPABLE)

- Minitor (Midnight Grey)
- 64MB 100MHz SDRAM With ECC (Upgradeable to 1GB*)
- 9GB* LVD SCSI Hard Drive
- 512KB Internal L2 Cache
- 3.5" 1.44MB Diskette Drive
- Standard Intel® Pro 100+ NIC
- Dell® Mouse
- Integrated Ultra2/LVD SCSI Controller
- 40X Max* Variable EIDE CD-ROM Drive
- Standard Openview Network Node Manager S.E.
- 3 Year Limited Warranty
(With 1 Year Next Business Day On-Site Service)***
- **Free Lifetime Telephone Technical Support**

\$2,929*
plus delivery

\$26 per month**

- Upgrade Options:
- Additional 2nd Intel® Pentium® III processor 450MHz \$652
 - Additional 9GB* LVD SCSI Hard Drive \$748
 - 15" Colour Monitor (13.7" v.i.s.) \$344
 - Novell Netware® 5.0 or MS Windows NT® Server 4.0* (call for latest prices)

E-VALUE CODE 421115-470311

DELL PRECISION™ WORKSTATION

DELL PRECISION™ WORKSTATION 410 INTEL PENTIUM™ III PROCESSOR 600MHz (DUAL PROCESSOR CAPABLE)

- Minitor Model
- 512KB Integrated L2 Cache
- 256MB 100MHz SDRAM With ECC
- 9.1GB* Ultra ATA Hard Drive (7200rpm)
- 3.5" 1.44MB Diskette Drive
- Integrated 3Com Fast Etherlink XL with WvOL
- Integrated Ultra2/Wide and Ultra Wide SCSI Controllers
- Integrated Dual ATA-33 EIDE Controller
- 32MB Diamond Fire GL AGP Graphics Card
- Integrated SoundBlaster Pro Compatible Sound
- 40X Max* Variable SCSI CD-ROM Drive
- 21" Sony Flat Panel Display Monitor
- Microsoft® Intellimouse™
- Microsoft® Windows NT™ 4.0
- 3 Year Limited Warranty
(With 3 Year Next Business Day On-Site Service)**
- **Free Lifetime Telephone Technical Support**

\$7,209

\$61 per week**

E-VALUE CODE 621130-470311

DELLWARE

HP OFFICEJET 635

- HP "All-in-One" It can Print, Fax, Scan & Copy
- Plain paper fax with 100 speed dials & 65 page memory
- Printing at 600 dpi at 5ppm black and 2ppm colour speed



\$659*
plus delivery

HP SCANJET 3300C

- Easy set up and fast operation with universal Serial Bus (USB)
- 36bit colour, 600 dpi optical and 9600dpi enhanced resolution
- Comes standard with HP PrecisionScan LT scanning software
- HP Copy Utility & Adobe PhotoDeluxe Home Edition standard



\$249*
plus delivery



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Sat 9am-3pm (EST)
In New Zealand call 0800 937 739*
for pricing and other information.

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THE E-VALUE™ CODE.
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DELD0194/APC/GSPREAD

BRIGHT AND LIGHT



Featured products are the Dell® Inspiron® 3700

Whatever direction your business is heading this Christmas, you can't miss the bright NEW Dell® Inspiron® 3700 notebook. It gives you lightweight mobility with heavyweight performance. You can even customise in blue and charcoal. There are no compromises either – the Inspiron® 3700 boasts high-end mobile processors ranging from Intel® Celeron® processor 400MHz to Intel® Pentium® III processor 500MHz, hard drives up to 18GB* and maximum TFT screen size of 14.1". It's a wonder it's so light! Dell's hotswap technology allows you to change the CD ROM & floppy drives without even shutting down. And if you're travelling overseas, you can upgrade to an international warranty, making it ideal for doing business on the move. So now it doesn't matter where you spend Christmas. Call Dell on 1300 303 107, or visit www.dell.com.au

CHRISTMAS DEALS FROM DELL

DELL® INSPIRON® 7500 R450VT INTEL® PENTIUM® III PROCESSOR 450MHz


- On-Die 256KB L2 Cache
- 128MB 100MHz SDRAM
- 10GB* Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI RAGE Mobility™ P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max* Variable CD-ROM Drive
- 15" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- 1 Year Limited Warranty (With International Warranty)
- Free Lifetime Telephone Technical Support

\$5,079* plus delivery

\$46 per week**

FREE Second Battery

Offer valid until 16th December 1999

 E-VALUE CODE 521126A-470311

DELL® INSPIRON® 7500 C466LT INTEL® CELERON® PROCESSOR 466MHz


- On-Die 128KB L2 Cache
- 64MB SDRAM
- 6.4GB* Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® 10/100 LAN CardBus PC Card
- 4MB ATI RAGE Mobility™ P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max* Variable CD-ROM Drive
- 15.0" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- 1 Year Limited Warranty (with International Warranty)
- Free Lifetime Telephone Technical Support

\$4,429* plus delivery

\$36 per week**

Upgrade to:

- 10GB* Ultra ATA Hard Drive \$280
- Add RealPort CardBus Ethernet 10/100 & Modem 56 (32Bit) \$280
- Add Iomega Click!™ PC Card Drive with one Click! Disk \$359

 E-VALUE CODE 521123A-470311

NEW DELL® INSPIRON® 3700 C400ST INTEL® CELERON® PROCESSOR 400MHz


- On-Die 128KB L2 Cache
- 32MB SDRAM
- 4.8GB* Ultra ATA Hard Drive
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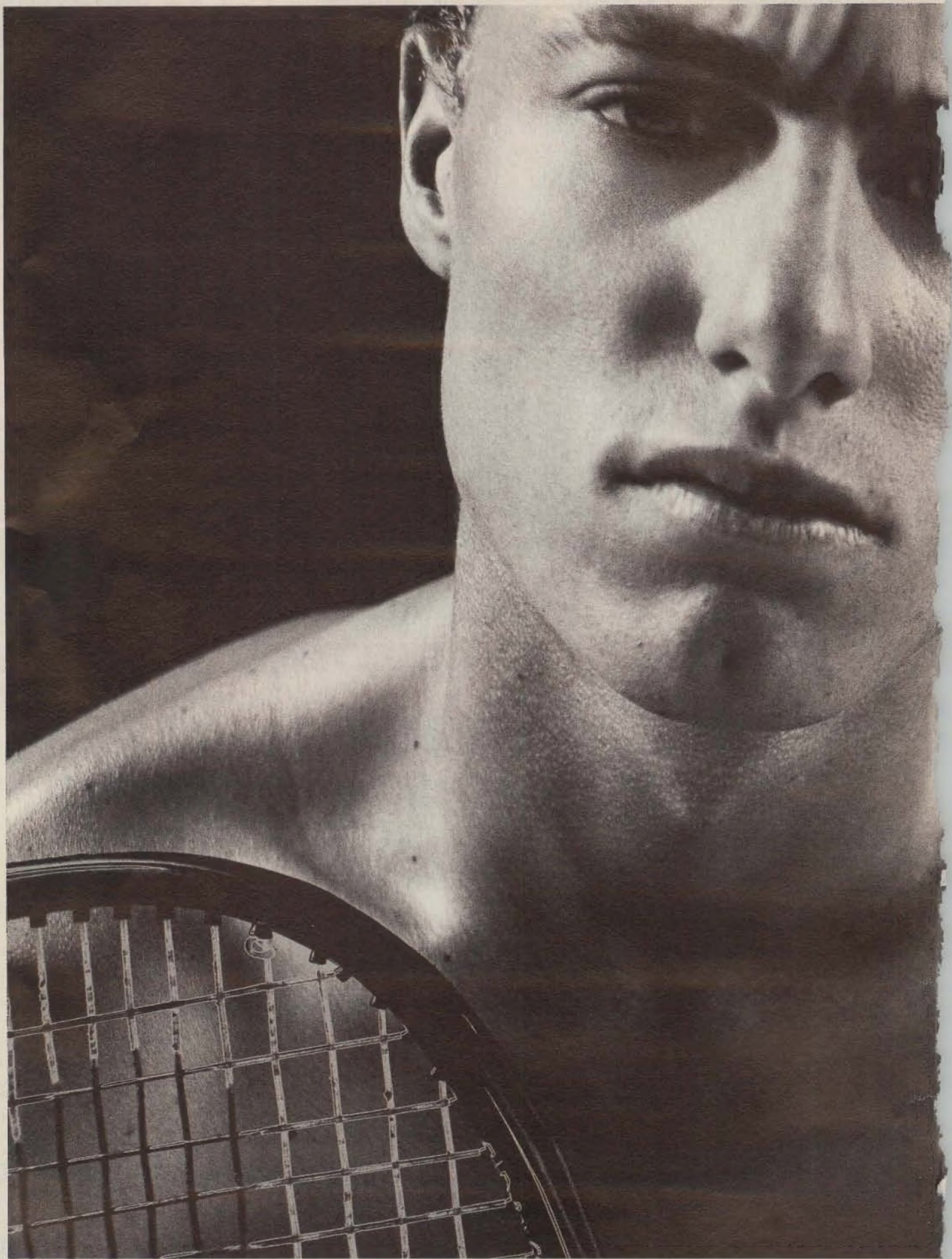


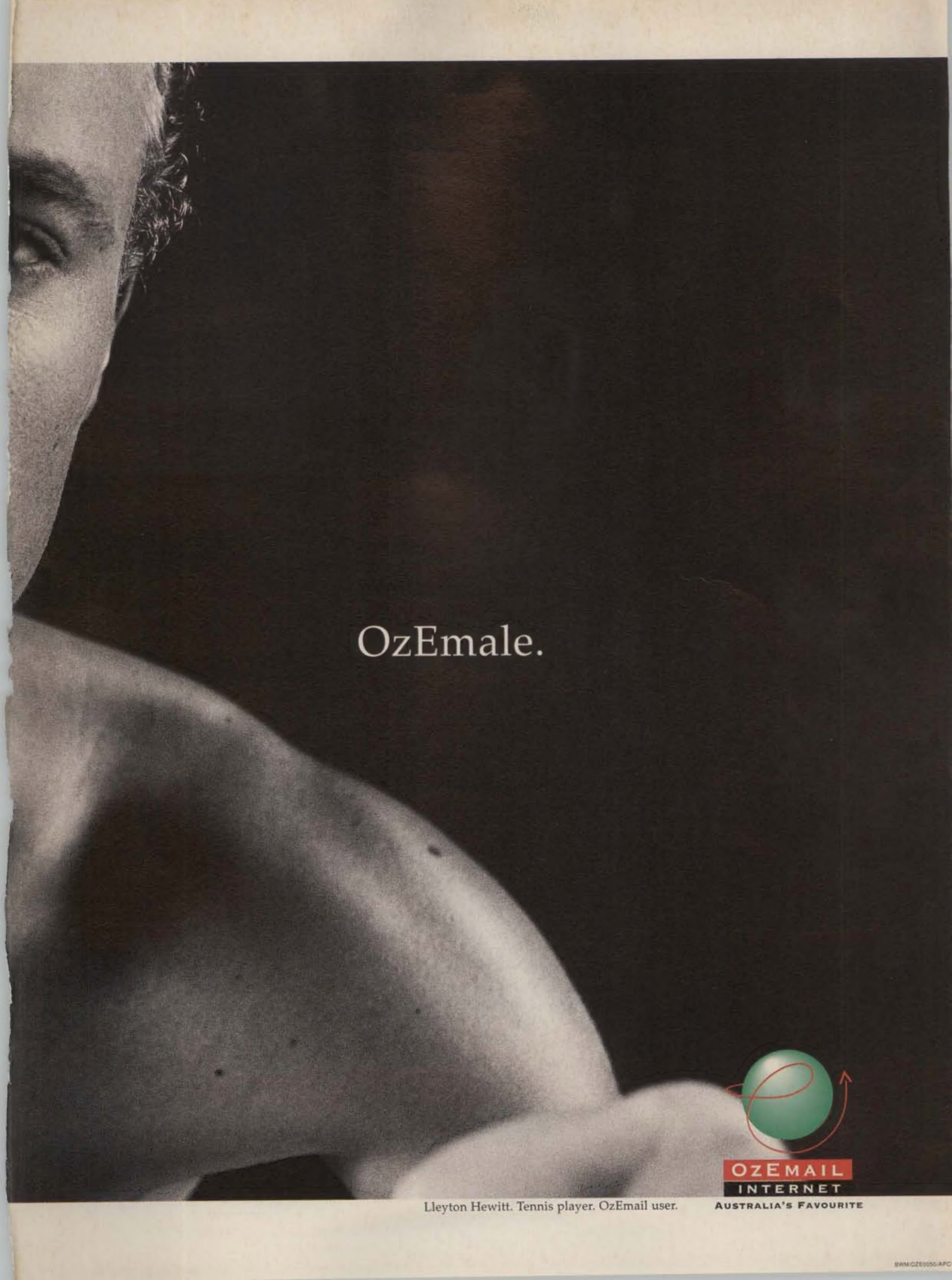
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EDITOR'S NOTE



End of the century PC snapshot

Here's a term that could excite your average marketing type: 'The fastest PCs of the century'. And here's what your average editorial type might do with the same subject matter: 'Good PCs'. Without going into detail about the way different people look at the same thing (too scary), whichever way you look at it, the PCs we review in this issue of *APC* literally *are* the fastest PCs of the century. Because next month we start a new one.

Each time we review a batch of PCs, we discuss how much the specifications have generally improved since the last lot we tested. We consider the results gleaned from the extensive testing in *APC* Labs and compare the value equation of each machine to give you a sense of what's really available on the market.

A couple of other things are standard too. First, the colour of the PCs we're sent for review has almost always been a dazzling, thrilling beige; this month that situation has changed ever so slightly for the better. Second, the chip inside has usually been from Intel, although there has been the occasional AMD or Cyrix-based system in our reviews. Cyrix is out of the picture now, but several AMD-based machines feature in this month's reviews, and they hold their own in performance terms.

Overall the machines reviewed in this issue offer you a good snapshot of the PC market at the end of the 20th century — they are blazingly fast compared to what's come before them, and overwhelmingly Intel-based, but some healthy competition is lurking.

I guess if we reviewed a stack of PCs in next month's edition we could still use the term 'Fastest PCs of the century' (being the only PCs of the century), but we'd run into trouble soon after using the same terminology.

Note: Those who wish to correspond to debate whether the 20th century ends at the end of this month or at the end of 2000, please don't. Symbolically, the 20th century ends with this month, and most of the planet's parties on New Year's Eve will support that notion. I'll certainly be supporting it, and I hope you have a good one too. See you next year.

Steven Fear

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PC REVIEWS

COVER STORY



PC SCORCHERS

Looking for a new PC? Well, now is the time to buy. With Christmas coming up, vendors are eager for your money and are bound to be offering bargains and discounts of one kind or another. Whether you need a PC for your company, your home office or just for gaming, APC's reviews cover the lot to help you make the best possible choice.

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PCs under \$1,500

- Adelong Everex Explora 450MHz
- Alpha Computers Celeron 500
- Beyond Computers SuperO C Class
- Gateway Neo
- Pioneer Value C500
- THX Discovery

PCs under \$3,000

- Adelong Athlon PC 550MHz
- Alpha Computer PIII-550
- Apple iMac DV Special Edition
- Beyond Computers SuperO P Class
- BlueFire ChromeStation 500T
- ComfortView Professional
- Dell Dimension XPS T550
- Gateway Performance 500
- IBM Aptiva GOA
- Pioneer 2000 SOHO Pentium III
- THX Apollo

Ultimate systems

- Alpha Computer Athlon 650
- Beyond Computers SuperO S
- Class Server
- Dell Dimension XPS T600
- Gateway Performance 600XL
- Packard Bell Platinum 600
- THX Probe



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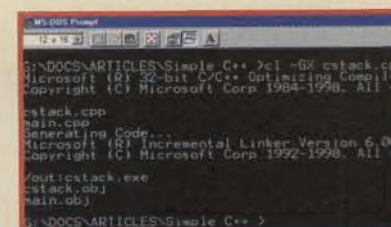
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FEATURES

GST AND IT

Taxing times

Australia's new tax system — which will incorporate the high-profile GST — promises cheaper PCs, tax-free purchasing for most companies and simpler accounting practices. It also means another compliance headache for IT departments. So, what do you need to know?



VIRUSES

DIGITAL DISEASE

Computer viruses are one of the most hyped threats of the technological era and have spawned a boom industry: antivirus software. New viruses appear all the time, and each is more complex than the last. But are they the threat that some would lead you to believe?

STORAGE AREA NETWORKS

LIKE SANS THROUGH THE HOUR GLASS

Storage Area Networks (SANs) promise continuous access to data, centralised management and the flexible provision of storage for enterprise-scale information systems. But despite emerging open standards, vendor/SAN lock-ins appear inevitable for some time to come.



CHIP FUTURES

PROCESSORS: the next wave

This year's Microprocessor Forum in San Jose saw a spate of new processor announcements. Itanium (formerly Merced) details were revealed, and the future of microprocessor architecture was unveiled.

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WEB CODE

beyond xml the future of markup languages

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XML — the heir apparent to the Internet's lingua franca, HTML — has the potential to drive Internet-based communication to new levels, and will prove extremely important in future applications.

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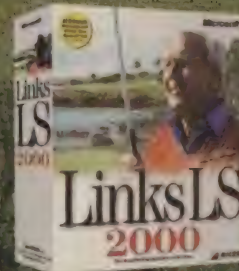
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Your guide to the cover CDs



apcmag.cd complements both the magazine and **apcmag.com**. Each month's disc collection features software related to articles in that issue, as well as special CD-



only features and the latest Web browsers, OS patches and popular tools.

Each piece of software includes instructions on whether you will need to unzip the file before installing it, and most also include README files. A complete list of software included on this month's discs is included below.

All you need to use **apcmag.cd** has been created in HTML. You do not need any special software to access the discs, other than a standard browser. The CDs have been tested using Netscape Navigator 3.0 and 4.0, and Microsoft Internet Explorer 3.0 and 4.0.

All software on the CDs is provided as is, without any warranty, express or implied. Complete terms and conditions are included on the CD itself; click on the Conditions of Use link for details.

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You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus-check every program before use.

While we've taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.

What's on the CDs

DISC 1

NEW & HOT

Windows: Animation Shop 2.0, Axialis Professional Screen Saver Producer, Brain Energizer 1.1, Capture Express 1.0 Beta, CompuShow Producer 1.0, Cursor Maker 3.0, DiskState 2.01, DUN Optimizer 1.00, Dynamic Submission 2000 5.057, Envision Publisher for Windows 3.01, FTP Voyager 6.2.0.0, Help & Manual 2.21, NextSTART 2.0.90, PowerZip 5.01, Sheriff SDK 2.1, ShockBox 1.3, Superscape/Intel Winamp DSP/VIS Plug-in, WebTutor 3.7, WinOptimizer 99 Deluxe 1.0, WinTabs 1.3.1

Mac: AceReader Demo 1.1.0, Archive 4.1, DeskBots 1.6.1, Flash Writer 1.0, GIFmation (FAT) 2.3.2, HelpDesk 9.99, MacOS Items Manager 1.5.1, MacTidy 1.0 Beta 4, MP3 Rage 1.1, MultiTimer Pro 3.5.1, NetCloak 3.0.3, Painting 1.6.4, people book 3.0 Beta 2, ProjectPlanner 1.2.4, Restore Desktop 1.0, SimpleVCD 2.1, Sound Studio 1.1, Storeys 1.5.1, Word Merge Pro 1.5, ZipIt 1.4

Linux: Aurora (redhog.b), Bluefish 0.3.2, CompuPic 4.6 Build 1022, Configure-it 1.0, Enlightenment 0.16.0,

Eucalyptus 1.1.0a2, Get Pop 0.2, glFtpD 1.71.1, G-man 0.0.7, gnomba 0.5.0, Gzilla 0.3.8, kruiser 0.4 (prerelease 1), Root Portal, SETEdit 0.4.35, shThemes, Tgif 4.1.22, tkbabel/tclbabel 0.3, TKRio 1.03, Webmin 0.74, xHtml 0.2.0

Handhelds: ASTROCKS (Enhanced MX version), Clock5, Graph 4.0, Merger 6.0, Pocket Bank 2.0; AddressPro 3.5, Mini-Book 1.7, TealGlance 3.23, TetrisV 1.05, Time; Tascal Folder Sync 1.10, Tascal-RegEdit 0.52, The Safe 2.3, Windmill 1.0

DESKTOP UTILITIES

BeDaemon 1.33, Buzof 1.46, Cascader 1.0, Cookies 2.0, CoolDesktop 2.5, CopyURL 2.2.1, Desktop Menu 1.0, Desktop News 1.1f, DeskTopia 1.03, DoubleDesktop 1.1, E-Icons 98 2.17, enable Virtual Desktop 2.1s, EntryPoint Beta, Europa 0.1 (pre-alpha), goScreen 2.7, High Voltage Desktop 1.0, Internet Commander 3.0, Invisible Pro 3.0.1.2, Jotter 1.71, Master Control Panel 3.0 Beta, PowerBar 1.80, PowerPro 2.1, QuickDesk 1.1, Quick Tray 2.0, RipBAR 2000 (Build 3317), SecurDesk LV 3.1, SoftProfile Juggler 1.0, StickyFront 0.4, Talisman 1.3, Taskmenu 3.5 and more

SCREENSAVERS

3D Dissolve, 3-D Fotocube, Adams Golf, Alien Worlds, Baseball, Christmas, Climber Saver, Desktop Destroyer, Distant Suns, Earth Screen Saver for Windows, Earth Views, Festive Fun, Fractal Clouds, Habitat Night, ScreenSmelter, Wheels Collection, Sunsets and Flowers, Yuletide Scenes


THEMEZONE

A Summer Place, Africa, Alien Jazz, Ally McBeal, As Time Goes By, Batik


Continued on page 10

Aladdin Ghostscript 5.50

In *Australian Personal Computer's* September 1999 issue cover CD (disc 1) contained Aladdin Ghostscript 5.50. Unfortunately, we omitted to include the source code as part of Ghostscript, and we did not make its licensing terms clear enough. Aladdin has a very favourable licence for use of Ghostscript, a term of which allows you to copy and distribute the program including source code. You will find the complete source code on this month's CD (disc 2) in the /GS directory, and the text of the Aladdin Free Public Licence in the directory /GS/public. APC apologises for any inconvenience caused through our omission of source code and/or printed reference to the licence.



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Continued from page 8

Butterflys, Beach, Beck Theme, Big Daddy Desktop Theme, Cardinals in the Snow, Christmas Globe, Christmas 2 Theme, Christmas 5 Theme, Christmas 6 Theme, Computer City, Daisy Patch, Dolphin, Extreme Pinball, F-Flame, Final Fantasy VIII, Goofy and Donald, Halloween, Grinch Stole Christmas, In the Mouth of Madness, Jackie Brown Desktop Theme, Jennifer Lopez, Lin'Air, Linuxberg, Machine Hunter, Mr Bean Theme 2.0, Need For Speed III, Party Animals, Picasso Theme, Pocket Monster, Porsche Boxster Theme, REM and more

GAMEZONE

Starfleet Command, Street Wars: Constructor Underworld

WORKSHOP

Windows: Master Converter 2.11, The Electric Mind 1.1, Pretty Good Solitaire 99 5.1.1, AceReader 4.1, WinRescue 98 8.09

Mac: Iconographer 1.0.2, Drop Drawers 1.0.1, Screen Catcher 1.5, Sleeper 3.2 Beta 5, Clean-Install Assistant 1.1, File Smiler 1.6.1, Decoder 2.0.4

Linux: Xsnow, mtools, bashrc, CBB

OS/2: Binary NewsReader 1.37, NewsBeat 1.00, PMINews, ProNews/2, Dialog Enhancer '99

INTERNET TOOLKIT

Adobe Acrobat Reader 4.0, Eudora Light 3.06, Free Agent 1.11, GolZilla 3.5, mIRC 5.6, RealPlayer G2, WinZip 7.0, WS FTP LE 5.06

BROWSERS

Microsoft Internet Explorer 5, Netscape Communicator 4.7, Netscape Communicator 4.08, Netscape Navigator 4.08

DISC 2**CLEAN PC**

4DiskClean 1.2, Add/Remove Pro 2.03, ASHAMPOO 99 Deluxe 1.0.0.2, Clean

System Directory 1.7, CleanMenu 1.0, CleanTemp 1.0, Disk Space Recovery Wizard 2.52, DiskDetective 3.2, DLLAide 1.14.0, Folder Cleaner 2.01, KMCS CleanWin 1.66, NT Perfect Companion 2.1, 4DiskClean 1.2, WashAndGo 1.0a, WinOptimizer 99 DELUXE 1.0

JOBSEEKER TOOLKIT

All-Purpose Resumes 1.01, CallCenter 3.5.7.5, Career InfoFinder 1.4, Easy Mail, eCVxpress 1.1, eVIs 2.0, FaxLauncher Light 3.01, Just The Fax 2.8d/c, Mario Teaches Typing, Mr Envelope 2.5, Power Typing for Windows 4.2, Presentation Publisher 2.6, Resumail 3.0c, Resume Master Deluxe 4.0, All-Purpose Resumes 1.01, Ten Thumbs Typing Tutor 2.0, The Right Resume 4.0, Visual Business Cards 3.2 Beta, Web Resume Writer 2.0.15, WordExpress 2.02, Wordware for Word 97, WriteExpress Easy Letters 2.1

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TUTORIAL PROGRAMS

Advanced MFC Programming 1.0, Beginning Visual Basic 1.0a, C tutorial 2.8, HTML In Review 1.0, Introduction to TCP/IP Programming, Learn Visual Basic 6 1.5, L-Nix 1.20s, Pascal tutorial 2.61, Really Basic BASIC 1.1, Thinking in Java (HTML format), VBA Tutor (Part One)

ESSENTIAL UTILITIES

Black Hole Organizer 1.52, ClipMate 5.1, CuteFTP 3.0, GetRight 4.1.1, McAfee VirusScan 4, NoteTab Pro 4.6, Paint Shop Pro 6, SpaceHound 32 3.0, WinZip 7

SHAREWARE GAMES

Bricks '2000 1.1, Bubble Puzzle 97 1.3c, Casino Verite Blackjack 2.04, Chess-it! 3.0, David's BackGammon Game 2.8.8, Deep Green Reversi 4.1.1, DX-Ball 2 1.2, Free Solitaire 3.0, SolSuite 2000 4.4

READER REQUESTS

Adobe ActiveShare 1.1, Attain Objects for Dreamweaver, ConnectPal Professional 6.40, DirectX Drivers 7.0, Macromedia Director 7, pcANYWHERE 9.0, Visual Day Planner 6.3, WinFax 9.0

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KIDS ART

Attack of the 50ft Chicken, Coloring for Children, Crayola Print Factory, Flying Colors, Funny Face 1.0, Great Adventures Western Town, KidLabel, Kids Animation Maker 3.2, Monstrous Media Kit, Music Brush 2.0 Screen Saver Designer, 3D Movie Maker, Rainbox, The Simpsons Cartoon Studio, ToonWorks, WizKid Painter, Xmas Tree

KIDS EDUCATION

AZZ Ware 3.2.0, Arithmetic Review 2.0, Bandusa, Checkers' Village 1.0, Magic 3D Coloring Book, Dr. Seuss Hamulator, Eddie & Minx: Map Game, Essay Punch, Grammar Renegades (Level A), HeartBeeps, Kids Talking Time Tutor, Math Stars 4.0.2, Mathematics Worksheet Factory Deluxe 1.61, Maths Shop 1.0, Music Ace 2.0, Primary Learning 5.0, Spelling Buddy 2.2, Twistory 2.0, TykeWriter 2.1.0, Wonka Trivia 1.0

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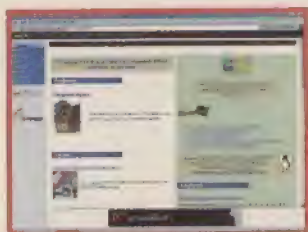
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CONDITIONS OF ENTRY

These conditions apply to all competitions in APC December, unless specific conditions are provided with the competition. Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in APC December. Entry is free and open to all residents of Australia other than employees of ACP Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies. The contests close last mail December 22. Enter according to the instructions supplied with the individual competitions. The judges' decision is final and no correspondence will be entered into. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of ACP Publishing Pty Limited, the promoter, 54 Park Street, Sydney, NSW 1028. The prizes are not transferable or redeemable for cash. Any change in the value of the prizes occurring between the publishing date and the date the prizes are claimed is not the responsibility of the promoter. Winners will be notified by security post and their names published in February APC.

COMING UP

PDAs: In January we'll review the latest crop of handhelds, looking at both Windows CE and Palm OS devices. Along with the reviews, our cover CD pack will contain a bevy of useful applications for your new palmtop.

Home entertainment gear: For the holiday season, we've looked at a range of products that will improve your home entertainment experience. We'll be providing a review of large screen monitors — 19in and more. Next, we'll be locking our reviewers in a room with a whole bunch of game controllers, from steering wheels to joysticks and gamepads, and taking them for a test drive. Finally, we'll be taking a quick look at some of the speakers on the market right now, from USB products to full sound systems.

Online radio: What is it, and where is it heading? APC explores what is most likely the future of radio broadcasting, where the listening options are potentially limitless. Our cover CD pack will also feature the latest in client software, so you can experience what online radio has to offer for yourself.

All this plus news, views, reviews, CDs and more in APC January, on sale December 23.

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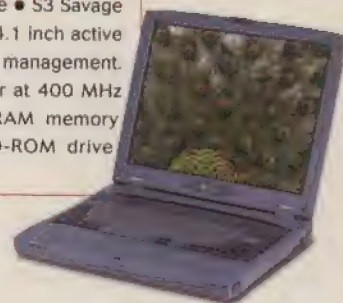
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SONY

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CONSUMER CHALLENGE

Compaq pauses shop plans

Compaq has back pedalled on earlier plans to open a chain of branded retail stores, and will not be opening any more of its own Compaq Connect shops "in the foreseeable future", following news of a partnership with Coles Myer.

Compaq managing director Ian Penman said the plans for a chain of shops has been put on hold. "We had not intended on opening any further stores in the foreseeable future," he said, adding that the pilot will continue to determine the venture's profitability. When the first of the specialised Compaq Connect shops opened in September, Compaq business and consumer general manager Greg Healy said the company hoped to have 120 shops in operation across Australia in the next year (as reported in APC November, page 17).

Penman made the comments after days of speculation that Coles Myer and Compaq had gone separate ways because Coles Myer didn't want to face direct retail competition from a supplier. Under the

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SENATE SLURS AND LEGAL LOOPHOLES

Net censorship concerns increase

There is less than a month to go before Net censorship legislation becomes law in Australia, and the Federal Government is still facing a barrage of criticism over its controversial control proposals.

IT minister Senator Richard Alston has come under fire in the Senate for falsely claiming support for the Broadcasting Services Amendment (Online Services) Act from a number of major international companies and for describing one group opposed to the law as "maniacs". Meanwhile, an analysis of the law suggests that far more companies may be affected by the legislation than originally anticipated.

In late September, a motion was put forward to the Senate by ALP Senator Mark Bishop on behalf of Democrat Senator Natasha Stott Despoja. The motion asked the Government to immediately address the concerns raised by industry and the community about the unworkable nature of the Government's approach and the act in general; urgently revisit

aspects of the act prior to its commencement on January 1, 2000; and table a report on the effectiveness and consequences of the act in the Senate at six-month intervals from the date of the regulatory regime's implementation. The motion was passed 32 votes to 29.



Alston, the architect of the act, said that although the Senate's motion was "fundamentally misconceived", he would be "delighted" to table reports every six months. However, he caused more concern when he claimed that the new legislation was supported by Lotus CEO Jeff Papows.

He quoted Papows as say-

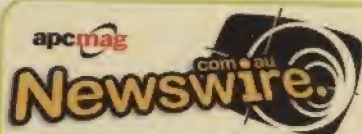
ing, "Industry has no issue with online content regulation. The industry endorses content regulation."

That assertion was flatly denied by Lotus officials. Bryan Simmons, Lotus vice-president of worldwide corporate communications, said that the company did not "in any way regulate the distribution methods used by our customers based on the content of the material, or suggest or dictate these to governments".

Simmons said this is the role of each country's elected representatives and not a role Lotus seeks to play. "Jeff's comments were meant only to communicate deference to the government's sphere of sovereignty, not support any government's particular policies," he said.

This was not the first time a high-profile business has contradicted the minister. In June, while on a trade mission in the US, Alston claimed Yahoo "generally endorsed what we were doing" in terms of the legislation. The comments were later dismissed by Yahoo. Alston

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Compaq pauses shop plans

Continued from page 17

renewed partnership, however, the two companies are "exploring opportunities to improve delivery of products and services and generate new revenue" in the small business and consumer markets, according to a statement issued during the height of the controversy.

Penman (pictured) said the partnership with Coles Myer is not new and that it cements Compaq's commitment to Australia's largest retailer.



Penman said discussions with a number of partners will continue. "We have been in discussions with Ron Harris over the past two weeks," he said. Penman declined to comment on whether Harris Technologies, which ceased selling Compaq desktops, would once again stock the products.

Harvey Norman, a former Compaq partner, ceased selling Compaq machines in August after the PC company confirmed plans to open its own chain of shops. Compaq's business with Harvey Norman was rumoured to be worth about \$100 million. When asked if talks with the retailer would resume, Penman laughed. "We can't really comment on that," he said. "It was not our choice to withdraw from Harvey Norman — it was their decision to withdraw from the relationship."

New approaches

Compaq's change of heart reflects the growing difficulties PC vendors have selling directly to consumers. Although other companies haven't gone to the extreme of opening their own shops,

unusual partnerships are being pursued.

In one of the most unlikely collaborations seen on the tech scene for some time, IBM and AOL have teamed with Video Ezy to bring a 'free PC' entertainment package to the market. Under the terms of the deal, consumers will be able to buy an IBM Aptiva PC with unlimited Internet access from AOL, plus eight free movie hires per week from Video Ezy. The package will cost \$25.99 a

week for a period of two years. The total cost is \$2,702.96, excluding GST (which will take effect on July 1, 2000). Video Ezy managing director Peter Scicluna said the company examined Internet-related "diversification opportunities" for two years before settling on the PC/Internet/video package. "We believe it will be very successful," he said.

In the US, IBM has taken more drastic action by deciding to quit the competitive retail market to focus on Internet sales.

A US-based IBM spokesperson told APC that IBM Aptiva PCs continue to sell well internationally. "They are just not differentiated on store shelves [in the US]," the spokesperson said. IBM officials are hoping to follow Dell's footsteps and increase its profit margins by selling PCs on the Internet.

An IBM Australia spokesperson said local retail sales will not be affected by the US decision. "We see enormous strength in the retail channel," he said. "Every region is looking at what the market is demanding. In the US the move is to direct sales."

Roulla Yiacoumi

Net censorship concerns increase

Continued from page 17

later repeated the claims in the Senate, saying Yahoo "thought it was a good idea".

Alston was subsequently taken to task in the Senate by Democrats deputy leader Natasha Stott Despoja, who cited a number of reports from **NewsWire** pointing to the inaccuracy of the minister's claims. "I think these are serious matters that need a response, as a matter of urgency from the minister," Stott Despoja told the Senate. "It has been widely debated online and of course in various Internet industry circles, the fact that the minister has repeatedly now not only contradicted or misrepresented statements made by company officials, but that he has done so at least on one occasion in this place."

That wasn't Alston's only problem. In a stinging attack on the civil liberties group Electronic Frontiers Australia (EFA), Alston said the group has "no interest at all" in responsible Internet regulation. He described EFA as a group of "low-grade undergraduate political activists who thought that they could get themselves a bit of a run on free speech arguments". Alston said industry is not opposed to his bill, but that "maniacs — these electronic frontiers outfits — are the ones 'running around stirring up trouble'".

The EFA subsequently exercised its right of reply to the comments. In a lengthy submission which was added to the parliamentary record, EFA chairperson Kimberley Heitman said Alston's remarks were factually incorrect. "The Senator's remarks impugn our individual good characters, reputations and credentials," he wrote. "[His] description of EFA falsely deprecates the breadth of academic and professional expertise of the EFA board," he said. "None are

undergraduates." Heitman also noted that Alston's allegation "as to our mental stability has no basis in fact".

As for claims EFA has no regard for concerns by parents, Heitman said there is a section of the EFA's Web site dedicated to informing parents how to protect children using the Internet. "This was compiled by EFA in 1996, long before any government agencies developed an interest in assisting parents," Heitman noted.

Wide scope

Meanwhile, an analysis of the Government's Broadcasting Services Amendment (Online Services) Act 1999 by the Internet Society of Australia (ISOC-AU) and law firm Phillips Fox has found up to 20,000 Australian businesses may be subject to the provisions of the act, which seeks to crack down on offensive and illegal online content.

ISOC-AU executive director Tony Hill said this figure may rise to 60,000 businesses within 12 months. "The definitions of Internet service provider (ISP) and Internet content host (ICH) are much broader than previously thought," he said. "We have communicated our analysis of the act to the National Office of the Information Economy (NOIE) through the minister, seeking advice on whether this interpretation is correct."

ISOC-AU and Phillips Fox found the act failed to provide a "meaningful" definition of 'Internet content host'. The analysis found many ISPs offer customers permanent direct Internet connections and that 'telehousing' — where the customer's server sits on the provider's network but is controlled by the customer — had become increasingly popular. **Roulla Yiacoumi and Angus Kidman**



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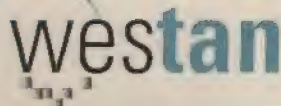
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DISTRIBUTION BATTLE

Linux shake-up looms

Gartner Group analysts are predicting a major shake-up in the worldwide Linux market in the next two years. It predicts the market for the open source OS could be dominated by a handful of key distributions.

Senior analysts at a Gartner symposium in Brisbane predicted that no more than three different distributions of Linux would survive in the enterprise market past 2002. The distributions tipped to survive the shake-up in Australia are Red Hat, Caldera and possibly TurboLinux.

Senior analyst Rolf Jester issued stern warnings for Linux developers, saying that the system will never be viable as a mainstream operating system. He advised companies to limit testing during the coming year, and encouraged novice users to wait until 2001 before using the system.

Jester's remarks echoed a recent report issued by Gartner which raised the hackles of Linux developers worldwide. Those warnings don't appear to be affecting development plans, as many major hardware and software companies have recently announced plans to support Linux.



Like many industry watchers, Jester believes Linux will be confined to specific functions such as mail and Web servers. Gartner predicts that by 2003, almost 25% of "appliance servers" will run Linux, although it will only account for 5% of revenue from all-purpose servers.

Linux is also tipped by Gartner to make its mark as an embedded operating system for niche black box devices. These will be used for single functions such as email or security, and will mostly be confined to the back end of large IT divisions.

Jester also talked down the possibility of Linux distributors challenging other Unix vendors. Most independent software vendors will find it hard to commit to the platform, for fear of losing mass market customers, he said. "Our advice to the Linux community is this is where it fits. Attempts to take it upstream are probably wasted," Jester said.

Interest in Linux continues to remain strong among software developers and IT departments. At the Gartner session, almost half the audience put up their hands when asked if they used Linux at home or at work. **William Maher**

ANSETT, QANTAS BAIL

Y2K: The flights get cancelled

Low demand for flights over the 1999 New Year's Eve period has led to the cancellation of several Qantas and Ansett flights. However, both airlines deny that the cancellations are directly related to Y2K safety concerns.

Ansett has cancelled all commercial flights between 11pm on December 31 and midday on January 1, 2000. A Brisbane-bound flight due to leave Osaka, Japan at 8pm has also been cancelled.

A Qantas spokesperson said nine flights had been cancelled because of low demand. At the stroke of midnight Greenwich Mean Time, the airline will have 11 international and 30 domestic aircraft in the air.

The Qantas spokesperson denied Y2K fears had caused people to avoid flying on New Year's Eve. "I didn't ask those people," he said. "We have no information to suggest that is the case."

An Ansett spokesperson was more forthcoming, saying media speculation about Y2K glitches, including planes falling out of the sky, had affected flight bookings. "I'd have to concede that," he said. "It is an abnormal Christmas/New Year rollover given the new millennium."

The spokesperson said a marketing decision was made to not promote travel over that time. "People are intending on being earth-bound and somewhat closer to alcohol in that period," he said. "I think [the coming of 2000] has influenced the travel plans of many."

Both Qantas and Ansett will have key executives on alert come December 31.

In related Y2K news, Qantas has submitted its latest year 2000 advice notice to the Australian Stock Exchange. The airline says it has developed contingency plans for some airspaces. "These will come into effect two hours before midnight local time in each regulated airspace and continue for 10 hours or as long as necessary to overcome any problems," the notice states.

Some overseas critical service providers, such as airspace authorities, have advised Qantas that their Y2K programs will not be completed until late 1999.

In an earlier statement to the ASX in March, the airline warned it may reduce some domestic and international flights. "Qantas will only fly if it is safe to do so," its report states.

Roulla Yiacoumi



News Roundup

• Com Tech has joined the growing ranks of companies offering application service provider (ASP) packages. The company has formed a partnership with Professional Advantage to create a new company, Managed IT, which will specialise in ASP packages for the small to medium business sector. Managed IT has already gone live with one customer, SDI Asia Pacific, which is running a mixture of packages, including Great Plains Financials and Microsoft Office.

• Dell is poised to topple Compaq from its longstanding position as the world's top-selling PC manufacturer, according to new figures from IDC. Preliminary Q3 sales figures released by the research company show that Compaq retains the global top spot, shipping 3.8 million PCs and accounting for 13.8% of global sales. Dell is ranked second with 3.2 million machines sold and 11.6% of the market. However, Dell's sales have grown by more than 59%, while Compaq's were up by

just 20%. The overall world market grew by 20% year-on-year.

• Music retail chain Sanity, which has launched an online music sales arm, is confident its online business will not cannibalise its existing physical business. Rather than perceiving its physical and virtual outlets to be mutually exclusive, Sanity intends to blend the two to expand its overall business. As part of this strategy, Sanity will install ecommerce music kiosks in at least half of its retail outlets within 18



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57% AND RISING

Net companies hit top of IPO ranks

Seven of the top 10 public floats in the last financial year were from the Internet and telecommunications sector, according to a KPMG corporate finance survey.

In its first annual survey of Australia's capital markets, KPMG found Internet floats accounted for \$250 million of the \$27 billion in funds raised on the Australian Stock Exchange (ASX) in the 1998/99 financial year. "Consistent with world markets, Internet companies made their presence felt in the Australian market... with seven new listings," the survey states.

ecorp and LibertyOne were the fourth and ninth best share market performers respectively. "[It] proved to be an excellent year for Internet-related companies making their debut on the ASX," according to KPMG.

Internet companies that floated on the stock market experienced, on average, a 57% increase on their issue price upon going public. KPMG attributes the relatively high yields to strong investor support for the sector, and market inexperience in pricing Net stocks.

The greatest premium on listing was achieved by online travel agency travel.com.au, which closed 135% up on its first day of trading. However, as the

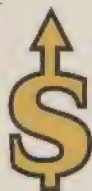
KPMG survey results indicate, that gain has been short-lived.

There has also been an increase in the number of backdoor listings on the ASX. Mining companies with large numbers of shareholders and small cash reserves usually provided the vehicles for this type of listing. "This method of listing provided a number of Internet-related companies with the opportunity to join the ASX without a proven earnings history," the report continues.

KPMG expects the number of Internet floats to increase this financial year. "Young Internet companies will continue to capitalise on relatively favourable market conditions in the next year," said corporate finance head Julian Vella. KPMG is forecasting 17 Internet companies to go public to raise a total of \$300 million in equity.

Acknowledging the partial waning of enthusiasm for technology stocks towards the end of the last fiscal year, KPMG nevertheless expects there to be sufficient support this year for more Net IPOs. "Support for this sector will increase as the market becomes more experienced at valuing Internet-related stocks," said corporate finance mergers and acquisitions head Ian Knight.

Cosima Marriner



Cashbook

The market is drawing some comfort from KPMG's finding that Net IPOs are among the strongest performers (see story at left). When it made its debut on the Australian Stock Exchange (ASX) in late October, Internet investment information provider Online Trading Systems (OTS) quickly managed a 16% premium to its issue price.

In an offer underwritten by Tricom Securities, the company issued 20 million shares at 50 cents each. This gave OTS a market capitalisation of \$20 million when it floated half of the company on the ASX.

The success of the OTS IPO was predictable considering the company's share offer closed oversubscribed, and that fellow financial information provider InvestorWeb achieved a 25% premium on listing. OTS intends to use the proceeds of its float to finance the expansion of its service into Asia and the US. The company posted revenue of \$1.3 million last financial year, and netted a profit of \$332,880.

Lake Technology, the developer of a system to deliver Dolby surround sound through normal headphones, is also going public to raise \$5.5 million. Established in 1991, Lake develops digital

communication software and exports its products to Japan, the US, Europe, Korea and Singapore. Lake is issuing 11 million shares at 50 cents each to raise \$5.5 million. This will give it a market capitalisation of \$52.4 million when it floats 10.5% of the company on the ASX in early December.

Listed ISP eisa announced a deal with the ANZ bank to provide a secure payment gateway for its ecommerce services. eisa will use ANZ's eGate product to verify and authorise customer payments at its Web sites. These include technology shop theshop.com.au and online trading service Stock Shop. eisa is forecasting \$40 to \$50 million worth of

transactions will pass through the eGate system within the next year. eisa chief executive officer Damien Brady said the deal with ANZ is central to the company's ecommerce strategy, as it would reassure customers about the safety of their transactions with eisa.

For up-to-the-minute financial news from the IT sector, check out Newswire's continuously updated Cashbook service at <http://newswire.com.au/cashbook/>.



News Roundup

months, offering online event booking, artist chat, concert streaming and refund and exchange services.

● US auction giant eBay is confident of success in Australia, despite being one of the last major auction companies to enter the local market. The company launched its Australian auction site in early October, ending months of speculation by industry watchers. "I don't think we have to play

catch up," said Australian managing director Alison Deans. "You have the widest selection of items, the widest market to sell to and the benefit of four years of experience." According to the company there are over 20,000 locals registered with the US service.

● Gartner Group has issued Australian businesses with a stern warning to avoid the first release of Microsoft's Windows 2000 operating system. Senior Gartner

executives said that Australian businesses should not consider using the new operating system until at least six to nine months after its release. For enterprises with more than 50,000 users, Gartner recommends waiting 12 to 18 months before deploying the software.

For complete versions of these and many other stories, be sure to check into <http://newswire.com.au>.

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CAUGHT SHORT UNTIL 2005?

No end in sight for IT jobs crisis

Analysts have warned that the skills crisis affecting the Australian IT industry could continue until at least 2005. They say that shortages will continue well beyond the Y2K crisis and through 2003. Further, it's predicted that by 2005, demand for specialised IT workers will continue to outstrip supply by 20%.

The blunt warning was issued to more than 1,500 attendees at Gartner Group's annual IT expo in Brisbane. Asia-Pacific region research chief Bob Hayward (pictured) told the gathering that unless the industry takes immediate steps, the problem could worsen. "We are losing the battle to attract people to this industry," he said.

The news is good for IT students, but it could cause problems for many inhouse IT workers. Hayward suggests that by 2002, 80% of businesses will begin outsourcing specialised IT operations. "The number of people on the internal IT payroll may very well shrink," he said.

According to current estimates, there are about 30,000 unfilled positions within the Australian IT industry. Gartner is not the first group to predict that the situation will get worse; IDC has already estimated

that there might be a worldwide shortage of at least 1.5 million workers by 2002.

Despite the dire warning, Gartner predicts a bright future for other industry areas. Most prominent is the prediction of a massive boom in ebusiness operations. By 2005, Hayward predicts that ebusiness will account for almost 10% of worldwide GDP.

Nevertheless, he warns that Australia ecommerce operators are in danger of being swamped by US operators. Hayward said that 30% of Internet startups would shut down in three years unless investors are attracted to Australia. "We are the corner store, and we are being put out of business by the Walmarts of America," he said.

The move to ecommerce is also affecting the jobs market in other ways. In its first Job Advertisement Series incorporating data from the Internet, the ANZ Bank has found there are more jobs advertised online than in newspapers.

According to the bank's figures, the

number of positions advertised on the top four recruitment Web sites averaged 44,238 a week during September, compared to the 33,445 advertisements found in newspapers for the same period. Similarly, the online medium recorded a 9.4% increase of job ads from August to September, compared to the 3.8% growth in the print medium.

The bank is cautioning against ascribing any economic meaning to its results at this stage. "The only economic conclusion I would draw is that employers' acceptance of the Internet as a mechanism for

reaching potential employees is growing very rapidly," said ANZ chief economist Saul Eslake. "I would discourage [concluding] the rapid growth in Internet advertising reflects growth in demand for labour is likely to be even faster than the growth in newspaper advertisements suggests."

William Maher and Cosima Marriner



HDTV A NO-NO?

Commission moves on digital TV

The Productivity Commission has recommended against imposing high definition television (HDTV) as the standard for the introduction of digital television.

"Digital technology opens up possibilities for new and improved broadcasting services that we could only have dreamed about a few years ago," said presiding commissioner Professor Richard Snape, following the release of the commission's draft report on broadcasting. "These include better TV reception, more channels, interactive services and greater diversity and access to broadcast programming. In short, much more choice."

In order to take advantage of these new services and to ensure the speedy conversion from analog to digital television, the commission said digital must be affordable to the community.

For this reason, the commission has rejected proposals to adopt HDTV as the

digital television standard. According to its findings, the \$1,000 cost of conversion to HDTV will make it too expensive for 95% of Australians. In addition, the commission said the large amounts of broadcast spectrum consumed by HDTV will prohibit the introduction of other broadcast services.

Instead, the commission recommends standard definition digital television (SDTV) be implemented. According to the commission, SDTV does not preclude any of the benefits of digital television, such as interactive services, more channels and improved reception. Snape said consumers would need to spend at least \$8,000 before the HDTV image quality noticeably bettered that of SDTV. The conversion cost for SDTV amounts to less than half that required to adopt HDTV.

The commission also cited the US experience where consumer take-up of HDTV sets has been low. It is favouring the UK

model, where SDTV is the specified norm. The commission said the little research which has been done into local demand for digital television services has revealed that multichannelling and interactive services are far more appealing to consumers than improved audiovisual quality.

"Australian broadcasting is at a crossroads and decisions taken now will affect the opportunities for Australians from digital broadcasting for many years to come," said Snape.

One media player with an interest in the outcome of the Productivity Commission inquiry into broadcasting, Fairfax, has welcomed the findings. "The recommendations on datacasting validate the chorus of consensus on the key issues," said Fairfax chief executive officer Fred Hilmer. "If embraced by the Government they would facilitate access by all Australians to the digital television age."

Cosima Marriner

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Application service provision is the latest computing buzzword, but even as the first services are rolled out, numerous questions remain.

Host of challenges for ASP crowd

Kent Duston knows he has a difficult task. "We're effectively asking customers who don't exist today to buy a product which they've never heard of," he commented, only half joking.

In his role as general manager for ASP services at Solution 6, Duston is responsible for the company's foray into application service provision (ASP), where customers rent applications from an external provider rather than purchasing and installing them locally. In late October, Solution 6 rolled out its ASP service, Centrum, making it the first vendor in Australia with a fully commercial ASP product.

"This is probably the most valuable franchise opportunity in the world today," Solution 6 CEO Chris Tyler enthused at the launch. "You don't need that trillion dollar franchise called Windows any more. Nobody owns this opportunity."

That may be true now, but Centrum isn't expected to enjoy solitary status in the market for long. The ASP Consortium, an industry group designed to promote the concept, has attracted numerous high-profile supporters including Cisco, Citrix, Compaq, IBM, Microsoft and Sun. IBM and Cisco have announced a partnership to help promote the concept of application hosting. At the same time, Hewlett-Packard signed a \$US2.2 billion ASP deal with Qwest in the US to provide online access to a range of software packages.

Microsoft is actively working to make its applications more hosting-friendly, although movement in that area isn't expected for a while. "In the short term, Back Office has much more appeal as an ASP offering than Office itself," Duston commented.

Oddly, Centrum won't initially offer access to Solution 6's own accounting applications; instead, it will provide a mixture of packages based around SAP's R/3 ERP package and Lotus' Domino groupware. However, Solution 6's own products are expected to be added in the near future, and the company is also exploring a partnership with Microsoft, although no deals have been signed.

The broad appeal of ASP is obvious. Mid-size companies, which don't have the

resources to maintain full-scale IT departments, can see obvious price advantages in paying someone else to provide applications on tap. Software companies are attracted to the idea of regular licensing revenue and interim upgrades, rather than the traditional peaks and valleys approach which results from major upgrade releases.



Although Solution 6 is targeting medium-size companies, other vendors argue that the ASP model can be applied at the very top end of the market. IBM and Hewlett-Packard both espoused the virtues of 'apps-on-tap' at a recent Gartner conference in Brisbane. Craig White, senior vice-president and general manager of the financing and complements group for enterprise computing at Hewlett-Packard, estimates that the worldwide ASP market is worth about \$US40 to \$US50 billion. He argued that the savings from applications rental are so great that even large companies should consider the concept. "Fortune 500 companies are not only looking at it, they're doing it right now," he said.

Colleen Arnold, managing director and chief executive of IBM Global Services Australia, was more cautious. She said there are still major pricing issues to

be resolved. IBM is currently trialling a number of different models in the US, renting applications from JD Edwards, Great Plains and SAP. "We haven't quite found the model [customers] have been looking for," she said. Nevertheless, Arnold remains confident that software will "all be Web-enabled three years out".

The price is uncertain

Price has proven to be one of the stumbling blocks for ASP plans. Centrum is adopting a fairly standard per user model with costs ranging between about \$20 and \$600 per user per month, depending on the applications provided. Other companies are considering alternative approaches, such as a flat per-application fee regardless of the number of users, or different charges depending on which parts of an application are used.

One issue which is still rarely considered in ASP rollouts is the overall maintenance of networks and hardware platforms. Centrum is providing access for its applications in partnership with Telstra's Big Pond Intranet service. The frame relay-based service provides more reliable access than conventional dialup, but it is expensive. At the launch, Ted Pretty, managing director of Telstra's convergent business next group, estimated that a typical cost for a group of 10 users would be about \$578 per month, although pricing varies widely depending on the access required. Initially, that network connection will only be available in capital cities.

Although some industry observers have suggested that the rise of ASP might see a resurgence in thin clients and network computers — a sentiment echoed by Chris Tyler in his comments at the beginning of this story — most current players don't envisage that there will be a shift away from the PC any time soon. Centrum's applications are initially being supported only on PCs and Macs. Duston said that Solution 6 is exploring deals with IBM and Sun for their thin client systems, but that would depend on user demand.

Angus Kidman and William Maher



Say 'ease'.

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MVC-FD83



MVC-FD88



MVC-FD91

*Applies to MVC-FD88 model only. †Applies to all models except MVC-FD73

SONY.

How hard could it be to broadcast a wedding live over the Internet?

Wedding of a Net lifetime

Ah. Weddings. Everybody loves them. However, most weddings have one limitation: geographical location. It is rare these days to have a network of family and friends living in the one place, so not everyone always gets to attend the happy occasion.

When my husband's sister Karen announced she was marrying her fiancé Serge in Sydney, many of their loved ones around the globe knew they had no chance of being able to attend. There was family in Chile and friends in Brazil and the US.

Most devastated at not being able to attend was Nan, the bride's grandmother. A former music teacher, Nan taught Karen to play the piano and instilled a lifelong love of music in her grand-daughter. The 86-year-old lives in a nursing home in Queensland and is unable to travel. What could be done?

In true 1999 wedding style, the idea of broadcasting the wedding on the Internet was suggested.

All that we needed was a computer and monitor, a video camera, a video capture card, a free phone line in the church and reception, a stable Internet connection, several metres of phone cable, a Web site to broadcast the wedding to, the software to do it, someone to film it, an understanding priest and a whole lot of luck.

My husband John took it on as his pet project. Once the priest gave his approval, it was full steam ahead. About the only thing John didn't have was a video capture card, but \$120 later, a LifeView Fly-Video 98 card promptly entered the picture. And so the games began.

Both the church and reception had phone plugs, although they were located nowhere near where the camera had to be. Mental note: get more phone cable. John had heard about a great site, Camarades, which provides a free live Webcam feed from anywhere in the world. A total of 10 users can simultaneously log on to watch the action. But video would have to do — there was no audio capability. The site, <http://www.camarades.com/>, features a live index of Webcams around the world which anyone can view. Once the site was set up, an email with the URL of where the

wedding would be broadcast was sent to all interested parties.

To keep a permanent memento of the wedding, we placed a video tape in the camera. Everything the Net saw, we were able to watch on video tape the day after the wedding, including audio.

We had a few different ISP accounts, but decided to go with Primus Internet as it had demonstrated the best stability — that is, no unexplained dropouts — to date. Geoff, a keen amateur photographer mate of John's, agreed to film the event for \$100. A church rehearsal a few days before the wedding went relatively smoothly.

On the day of the wedding, Geoff got to the church in plenty of time to set up all the equipment. As the phone plug was in the church office in a building next door to the church, the phone cable had to snake out the church side door and over a pathway into the next building, before finally reaching the phone plug at the far end. Sixty metres of cable was required. We prayed — we couldn't have been in a bet-



some metres away in the bar area so cables were passed through the rafters in the ceiling to avoid any accidents. The 'world' got to see the cutting of the cake, speeches, dancing and a lot of people generally having a ball.

We prayed that the phone line was reliable and that the Internet connection would make it through the 45-minute service.

ter place — that the phone line was reliable and that the Internet connection would make it through the 45-minute service. It did.

It sounds unbelievable even now to say that everything worked. So many things could have gone wrong, but they didn't. The ceremony was broadcast in brilliant fashion.

At the reception, the computer, monitor, video camera and assorted cables were lugged in and set up behind the central dance floor. The phone plug, though, was

A few hours later, after the bride and groom departed, we sat around marveling at what had just been accomplished. We had broadcast a wedding over the Internet — a definitive sign of our times.

Somewhere on Queensland's Sunshine Coast, there was a happy grandmother watching the day unfold over a prehistoric but adequate PC in the back office of a nursing home.

Aren't you glad to be living at a time like this?

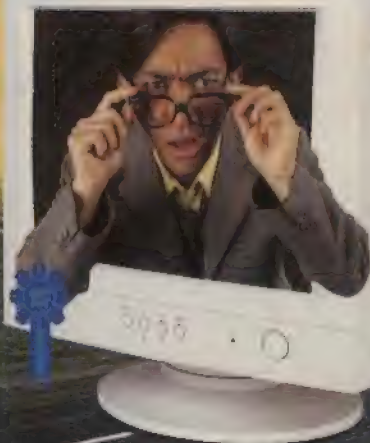
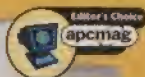
Roulla Yiacoumi

And the winner is.....

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"Overall, we found the screen image had sharper definition and more clarity than any of the other models, including the 21in models." - *Australian Personal Computer, April '99.*

"The Mitsubishi Diamond View is alot of monitor boasts 18in of viewable area and brightly coloured, high resolution images" - *PC World, April '99.*



DIAMOND VIEW 1772e 17" Colour Monitor

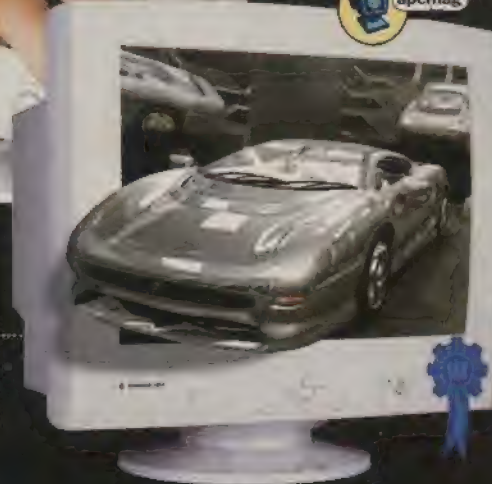
"... has outstanding picture quality and image controls combined with a three-year on-site warranty to make this monitor a very attractive proposition for the home or SOHO user ... an edge for word processing, spreadsheets or gameplay. Highly recommended." - *Australian Personal Computer, April '99.*

DIAMOND VIEW 1570i 15" Colour Monitor

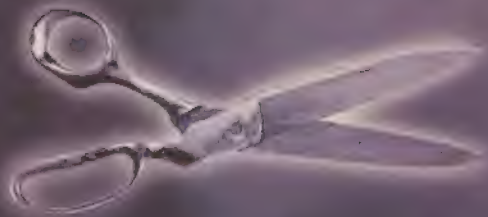
Voted No. 1 PC Monitor by - *PC World, April '99.*

DIAMOND VIEW 2107 21" Colour Monitor

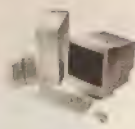
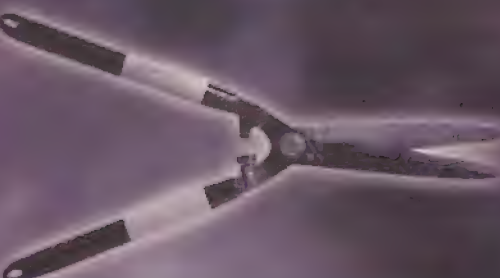
"Mitsubishi has done it again with the 21in Diamond View ... We loved the controls ... The picture was extremely crisp ... Text was extremely easy to read, and the quality over a distance was great." - *Australian Personal Computer, April '99.*



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AMD Athlon 700MHz

When AMD released its 600MHz Athlon processor earlier this year, it was the first time a manufacturer other than Intel had the fastest and most powerful x86 processor available. Despite the fact that Intel soon caught up in the megahertz race, the Athlon still had a performance edge over the Pentium III at the same clock speed.

AMD leapt ahead again, releasing the 700MHz Athlon well before Intel reached the 700MHz mark. Even though AMD's advantage lasted only a matter of weeks, it's extremely significant that AMD, not Intel, is pushing the performance limits.

Intel recently retaliated, launching its new Pentium III processor at speeds of up to 733MHz. Intel's new Pentium III is built in a 0.18-micron process, contains 256K of level 2 cache integrated in the processor chip, and runs on a 133MHz

frontside bus. Intel has redesigned its cache system and claims up to a 20% performance increase over the older design of the Pentium III at the same clock speed. If this is true, Intel's 733MHz Pentium III may be more powerful than the 700MHz Athlon, but Athlon might still have the edge. In the next round, AMD is hoping to launch its 0.18-micron Athlon at 800MHz early next year.

Aside from the 700MHz processor, the specs of the test system AMD sent us were basically the same as the 600MHz machine APC reviewed in September (see APC September, page 29). It had 128M of memory, an 18G hard disk drive, a Diamond Viper V770 Ultra graphics card and a Creative Labs Sound Blaster Live soundcard.

These are fairly standard specifications for a high-end desktop system, and comparable to many of the high-end systems

we looked at in the annual PC feature (see page 88 of this issue). In most tests, the 700MHz Athlon system scored around 5% to 10% higher than the 600MHz Athlon we reviewed in September. This makes sense, because although the processor is 17% faster, the graphics and disk subsystems are the same, and performance is a combination of all these systems working together.

Compared with the high-end systems we looked at in the PC reviews (see page 114), the Athlon clearly deserves the title of the fastest PC processor available today. Aside from the disk tests and the Half-Life timedemo, the Athlon scored higher than any of the PCs reviewed, by a significant margin in most tests. The 3D graphics, game and High-End Winstone tests showed that the Athlon's strengths clearly lie in multimedia; it achieved scores that blew away anything currently available.

Because AMD launched earlier, 700MHz Athlon systems are likely to be available — at least in the US — for the Christmas season, while the new Pentium IIIs probably won't make it into PCs until next year. Compaq and IBM launched 700MHz Athlon-based systems for the US market, though it's uncertain when these systems will be available in Australia.

Australian users still may have to wait a while before 700MHz Athlon systems are available here, though they may start appearing in small numbers by the time you read this. However, because of the premium AMD puts on its top-of-the-line processor, it might pay to opt for a 650MHz or 600MHz system, considering it

Product name	AMD Athlon test system
Distributor	AMD
Phone	(02) 9959 1937
Online	http://www.amd.com/
Price	N/A
Warranty	N/A
Specifications	
Processor	700MHz AMD Athlon
L1 cache	128K
L2 cache	512K
RAM and type	128M SDRAM
Hard disk drive	18G Western Digital AC418000
Hard disk controller	AMD Viper PCI Bus Master IDE Controller (V1.03RC)
Hard disk file system	FAT32
Monitor	N/A
Graphics card	Diamond Viper V770 Ultra
Video bus type	AGP
Video RAM	32M SDRAM
Video controller chip	nVidia RIVA TNT2
Soundcard	Creative Labs Sound Blaster Live
OS available	Windows 98/NT

Benchmarks

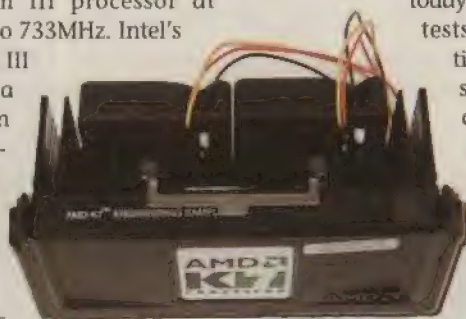
Business Winstone 99	28.5
High-End Winstone 99	37.4
High-End Winstone 99: AVS/Express 3.4	6.2
High-End Winstone 99: FrontPage 98	2.2
High-End Winstone 99: MicroStation SE	3.7
High-End Winstone 99: Photoshop 4.0	5.4
High-End Winstone 99: Premiere 4.2	4.1
High-End Winstone 99: Sound Forge 4.0	3.3
High-End Winstone 99: Visual C++ 5.0	4.0
CPUmark 99	62.3
FPU WinMark	3,810
Business Disk WinMark 99 (K/sec)	4,920
High-End Disk WinMark 99 (K/sec)	15,150
Business Graphics WinMark 99	287
High-End Graphics WinMark 99	920
3DMark 99 Max	6,422
Viewperf Advanced Visualiser (fps)	17.98
Viewperf DesignReview (fps)	10.73
Half-Life timedemo at 800 by 600 (fps)	51.4
Quake 3 timedemo at 1,024 by 768, 32-bit colour (fps)	36.9

Note: The product used in these tests is a test system provided by the manufacturer and is not currently available for sale.

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will still beat anything Intel has on offer at the moment.

Josh Mehlman



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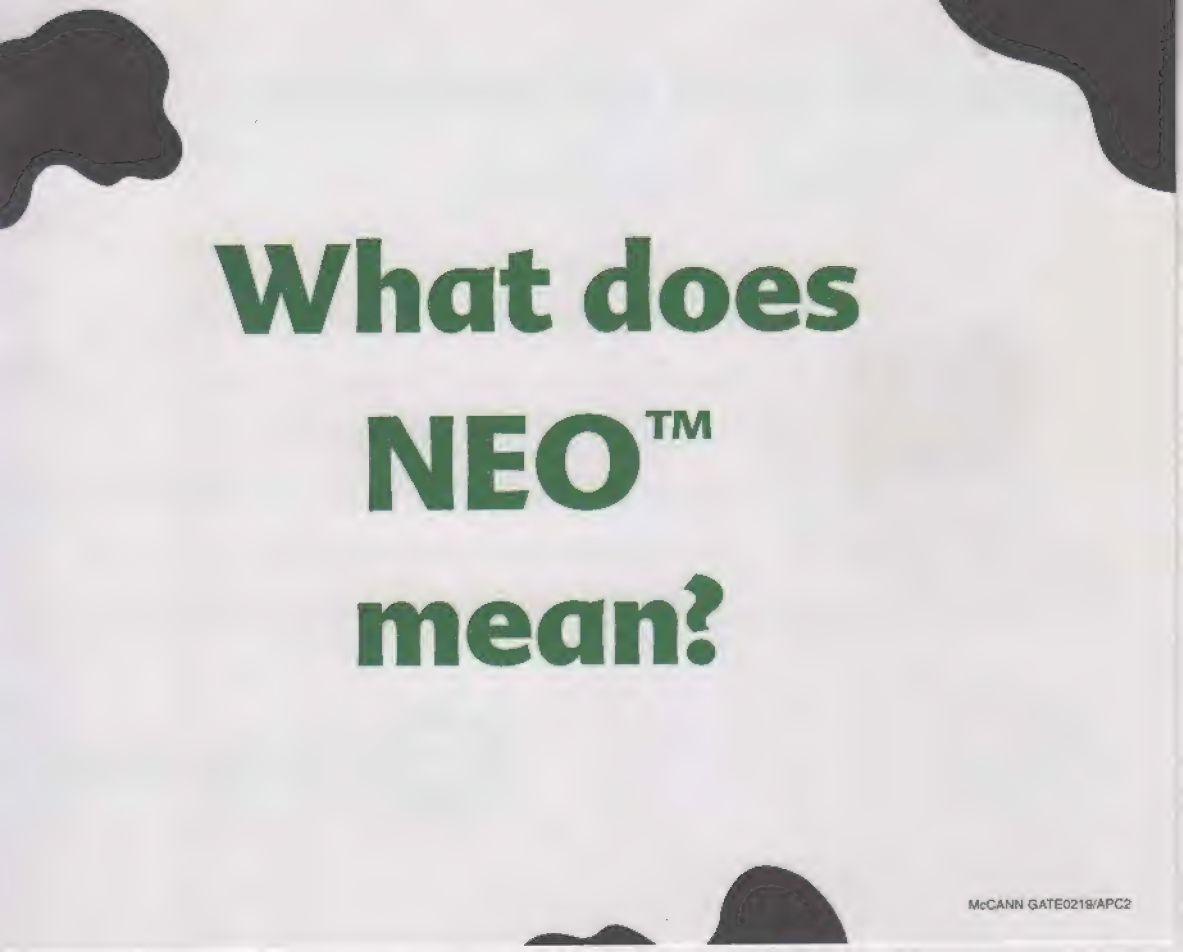
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Dell Inspiron 7500 Pentium III

The Dell Inspiron 7500 notebook is the first notebook we've seen that uses Intel's Pentium III for mobiles — in this case, at 500MHz. The fastest APC has previously reviewed is a 400MHz Pentium II notebook. Being a Pentium III, the Inspiron now has access to the new SSE instructions provided by the architecture, although the usefulness of these instructions to the notebook user is questionable.

There's no way to skirt the issue that the Dell Inspiron 7500 notebook is huge. Sure, APC has seen some large notebooks in its time, but this one definitely stands out, especially as the recent trend is slimmer and lighter. It's not just physically large — nearly everything about it exceeds what was previously available in a portable.

The notebook APC tested was powered by 128M of RAM. The shipping model, however, will feature 256M of RAM as standard. Its 25G EIDE ATA-4 Ultra DMA hard disk drive is the highest capacity drive we've come across in a notebook. As expected, the drive returned some excellent results in both the Business and High-End Disk WinMark tests.

The notebook's footprint can be largely attributed to the 15in TFT active matrix display which overhangs the bottom half of the notebook. (The shipping version will feature a 15.4in display). It is capable of a crystal clear internal resolution of 1,400 by 1,050dpi; everything on the screen looks tiny at this resolution, but you get great screen real estate. At 1,024 by 768dpi, the display is fuzzy and impossible to view for any length of time. The notebook is capable of an external resolution of 1,600 by 1,500dpi.

On the front left-hand side of the notebook, there is a 6x DVD-ROM drive which doubles as a 24x CD-ROM drive and there is a floppy drive beneath it. On the right-hand side, you'll find a 'Megabay' — as Dell calls the bay that holds the battery. The Megabay can also accommo-

date an internal Zip drive (optional extra) or an additional hard disk drive.

At the back of the notebook are parallel, serial, PS/2, USB and infra-red ports, as well as TV out (via S-Video, making it next to useless for most people), external monitor and docking bay connectors. On the back left-hand side, there is a standard two Type II or one Type III PC card slot.

As with the Gateway Solo 9300 Pentium II 400MHz notebook we reviewed (see APC September, page 40), the Dell Inspiron 7500 uses ATI's Rage Mobility graphics adaptor with 8M of SGRAM. Indeed, the Inspiron put in its best performance on the graphics test front, pulling in a Business Graphics WinMark 99 of 125.3 and a very high 403 in the High-End Graphics WinMark 99 (compared to Gateway's 101 and 271 respectively).

It also aced everything else on the market in the other benchmarks — which you'd expect, given the new processor. It scored 23.3 in Winstone 99, well ahead of the 400MHz system's 16.5.

Its disk results were also far ahead; nearly 50% higher than the Gateway system.

Considering the amount of technology this notebook needs to power — not to mention the screen — the battery life of four hours and seven minutes was impressive. On

the downside, a noticeable hum caused concern.

Given the size of the notebook, there is some serious weight to consider here. At a shoulder-sagging

4.3kg for the unit alone, the travel weight (which includes the power adaptor plus any optional extras)

Product
Distributor
Phone Number
Online
Price
Warranty

Dell Inspiron 7500
Dell
1300 303 107
<http://www.dell.com.au/>
\$8,149
1 year

Specifications

Processor	500MHz Intel Pentium III
Secondary cache (K)	512K
RAM and type	256M (tested at 128M)
Hard disk drive	25G
Hard disk controller	Standard Bus Mastering IDE Hard Disk Controller
Hard disk file system	FAT32
Video bus type	AGP
Video RAM	8M SDRAM
Video controller chip	ATI Rage Mobility P 2D/3D Accelerator
Pointer device	Glidepad
Dimensions (cm) (h by w by d)	6.4 by 32.8 by 26.7
Travel weight	4.3kg
PC card slot type	Two Type II or one Type III
CD-ROM drive/DVD	6x DVD-ROM
Soundcard	ESS Maestro 2E
Internal modem	None
Display	15in
Maximum internal resolution	1,400 by 1,050
Maximum external resolution	1,600 by 1,500
Battery type	Lithiumion
OS available	Windows 98/NT 4.0
Expansion slots	CRT, IrDA, keyboard/mouse, serial, parallel, 1 USB, mic-in, video-out, audio-out

Benchmarks

CPUmark 99	47.3
FPU WinMark	2,680.0
Business Disk WinMark 99	3,580.0
High-End Disk WinMark 99	12,100.0
Business Graphics WinMark 99	125.3
High-End Graphics WinMark 99	403.0
Business Winstone 99	23.3
BatteryMark: battery rundown time	4:07

Note: The product used in these tests is a shipping version available to the public at the time of publication unless otherwise stated. Winstone, WinBench and associated products are registered trademarks of the Ziif-Davis Publishing Company. These tests were performed without independent verification by Ziif-Davis and Ziif-Davis makes no representations as to the results. To test the battery we had APM enabled on all notebooks. All power-saving features were disabled.



would probably inch closer to the 5kg mark.

Finally, the price of this notebook will probably also be one of the highest you've seen: \$8,149. Dell says the notebook is aimed at the SOHO market and for people who travel 'point to point' but not necessarily constantly. Whether such a person would fork out this kind of money for a high-end notebook is another question altogether.

Roulla Yiacoumi

PERFECT PICTURE IN,
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Connect an EPSON GT-7000 flatbed scanner with an EPSON STYLUS COLOR 740 inkjet printer and watch your images come to life. With the speedy EPSON STYLUS COLOR 740 you'll see 1440 x 720 dpi colour images, noticeably richer and true to life. And black text that's laser sharp. The GT-7000USB scanner recognises over 68 billion colours. 600 x 1200dpi optical resolution means accurate colour reproductions, and as with the printer, a USB interface supports both Windows® and Macintosh™ environments. It's the affordable total colour solution for the home or small office, with the re-assurance of EPSON quality.

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EPS 0369 The HALE Agency

Apple Mac OS 9

Summer is here, so it must be time for a new version of Mac OS. Most of the changes are very welcome, though in some areas Apple is playing catch-up with Windows. Mac OS 9 marks the debut of the Carbon APIs, providing developers with a stepping stone from the traditional environment to Mac OS X.

Requirements are a Macintosh that originally shipped with a PowerPC processor, at least 32M of physical RAM and 40M of virtual memory. APC tested a golden master copy of the US version.

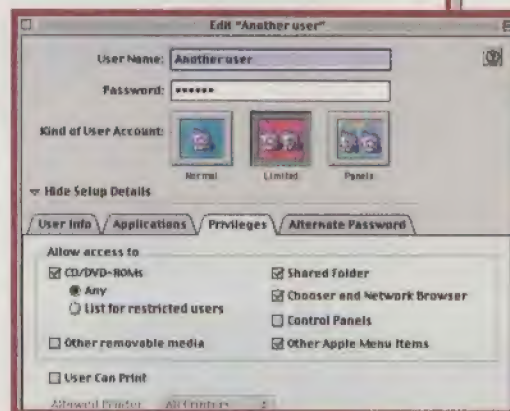
Support for multiple users is finally a part of Mac OS. Each user account has its own preferences and other settings, giving a degree of privacy and reducing clutter on a shared system. It also provides a mechanism for parental or teacher control as users other than the owner of the system can be given limited access to applications, CD or DVD-ROMs, and other resources such as control panels and printers. Logins are controlled by password or voiceprint, but APC did not achieve consistent results with voiceprints.

A new feature called Keychain is similar to the feature of the same name in System 7's PowerTalk technology. It stores multiple user IDs and passwords, protected by a master password. Once the keychain is unlocked, user IDs and passwords are provided automatically. The keychain can be locked either manually, automatically after a period of inactivity, or when the system sleeps. It works well with AppleShare servers (except when connecting via the Chooser), but APC had no success with Web pages that require logins or when using Remote Access to connect to an ISP. The keychain will become more useful as more applications support it. A file encryption command is available in the Finder's File menu and the contextual menu, and pass-phrases can be added to the keychain.

Sherlock's user interface is now based on the QuickTime 4 Player, which hasn't received universal acclaim. The Find File and Find by Content functions have been combined, so it is now possible to find, for example, files modified before a certain date and containing a particular string. Such criteria can be saved for later reuse. Apple claims Sherlock 2 indexes and searches faster than its predecessor, but APC found indexing was slightly slower and searching was fractionally faster. Programs can immediately update the volume index

after saving a file. The Internet search facilities have been reorganised into 'channels' such as People (for example, Four11), Shopping (eg. Amazon) and News (eg. CNN). Custom channels can also be created.

File Sharing and Program Sharing now run over TCP/IP as well as AppleTalk. Care is therefore needed when connecting to the Internet.



Software Update provides a mechanism for automatically downloading and installing software updates over the Internet. You can specify a schedule for checking for updates (between once a day and once a week), and if you're not connected at the appointed time, Software Update will check the next time you do connect.

PlainTalk voice control is greatly improved in Mac OS 9. APC found previous versions practically unusable, but recognition rates are now much improved. There is a good selection of preprogrammed commands, and you can add your own by writing AppleScripts and dropping them into the appropriate folder.

USB improvements include USB audio (so you can connect USB speakers to a Mac) and support for suspend and resume, which means we should no longer see 'ghost' printers in the Chooser after a Mac has been asleep. Mac users who have upgraded with a USB PCI card (like our test 7500) must reinstall USB Card Support 1.2 (downloadable from Apple's Web site). Hopefully, that will soon be updated to match the USB support in Mac OS 9. There were some problems with peripherals: the Microsoft IntelliMouse control panel had to be moved down the load order, and Hewlett-Packard is working on Mac OS 9 compatible printer drivers.



Utility programs will likely be the most affected by the changes in version 9. Disk utilities will need updating to handle files larger than 2G, and some others fall foul of the API changes. New versions of StuffIt Expander and DropStuff are provided with Mac OS 9, and a StuffIt Deluxe update is needed for full compatibility. Quick tests of some popular applications such as Adobe

Photoshop, Microsoft Office and Internet Explorer were successful, but that's far from conclusive. There are plenty of other changes, including an increase in the maximum number of open files to 8169 (the previous limit had become a problem), and the old Monitors & Sound control panel has been split into two separate items. ColorSync, File Exchange and Open Transport have been updated; the latter now claims improved compatibility with Windows NT DHCP servers and includes an Apple Remote Access server. FontSync helps desktop publishers avoid problems with font variations between systems.

In the time APC had to test Mac OS 9 for this review, it proved extremely stable. We quickly came to appreciate the new features, which justify the cost of an upgrade. As usual, there will probably be a delay while software vendors deliver full compatibility and take advantage of the new features, but most compatibility problems should be well on the way to a solution by the time you read this.

Stephen Withers

Distributor	Apple
Phone	133 622
Online	http://www.apple.com.au/
Price	\$149
In short	Hardly revolutionary, but a neat upgrade.

Compaq MP1600

We're normally skeptical of the portability of any projector unit we receive, because for most projector manufacturers, 'portability' means affixing a handle to one side of a large box equivalent in size and weight to a cinder block.

Compaq's first foray into the projector market, the MP1600 is the antithesis of other projectors. In fact, it is the first truly portable projector that APC has seen. This snappy little unit weighs in at only 1.9kg. It has a very small footprint — 20.9cm high, 22.84cm long and 7.6cm at its widest point — so it will take up minimal room in a suitcase. The MP1600 comes bundled with a snap-on



carry handle and a small carry bag, and is excellent for the first time user.

The Compaq MP1600's user interface consists of a highly navigable onscreen display (OSD). There are three buttons: one for menus and actions, and the other two for cycling up and down through the options. These are located on the side of the projector that allow you to navigate the OSD. The focus ring that allows you to adjust the sharpness is just above the lens. It is the simplest and most user-friendly projector APC has used; we had the unit up and running in no time.

Unfortunately, the inputs on the MP1600 are few and far between, limited to standard VGA and a DFI input. An optional video adaptor that plugs into this second port allows you to display

images from handhelds, VCRs and DVD players. As it is, you can project an image size from 65.3 to 653cm (two to 20 feet), although APC wouldn't recommend using the projector at the longer distance required to gain the picture size.

Although the lamp is rated at only 600 lumens, the picture is bright and crisp. Compaq claims this is due to the digital light projection (DLP) technology it uses. Unlike LCD projectors, the micro-mirrors within a DLP reflect more of the original image's light — up to 90% compared to LCD's 70%. The gaps between LCD cells are more marked than the micro-mirrors, which can affect the sharpness of an image.

Darren Ellis

Distributor	Compaq
Phone	1300 368 369
Online	http://www.compaq.com.au/
Price	\$8,995
In short	An excellent unit, especially for the road warrior.

Diamond Rio 500

MP3 buffs have been waiting some time now for Diamond to replace its Rio PMP300 digital music device, which was released late last year. Thankfully, it seems to have been worth the wait. The new Rio 500 features some major improvements over its predecessor, including a USB connection and extra memory.

USB is a must-have for portable MP3 players. Without it, music files have to be transferred from the PC via a parallel cable, which is a very slow process. With the new USB cable, APC was able to transfer an entire 58M album to the Rio in slightly more than two minutes.

Another improvement is the 64M of onboard memory, which is double the capacity of several competing devices. This is enough to store more than an hour of CD-quality music, and can be increased (at extra cost) with an additional 16M or 32M memory card. Still, you will have to use lower quality MP3 files if you want to fit much more than a standard album.

The Rio is also one of the first MP3 players to include copyright security. The new player supports the MetaTrust security system, which will help artists to track music

downloads on the Web. However, the scheme isn't in widespread use yet, and Diamond is planning to release a free upgrade for the Rio when it becomes available. Of course, it's debatable whether this feature will earn or cost Diamond sales.

Transferring music from CD-ROM or the Internet is a breeze with the Rio 500. Diamond has upgraded all its audio software, and now features links to free music at RioPort.com. It's also very easy to create MP3 files from your favourite CDs.

Like all MP3 devices, the only drawback when copying music is sound quality. During testing there was an annoying squealing noise in several MP3 tracks, even at the recommended sampling rate of 128Kbps. This usually affects certain styles of music, although it can also vary with different recording software.



Nevertheless, Diamond has done a lot to improve playback on the Rio. The new design includes a bookmark function for long audio tracks, as well as a handy scrolling button to browse quickly through songs. The style-conscious will be relieved to know that the plastic shell comes in purple, grey or blue.

Unfortunately, the Rio 500 does not include voice recording or an FM radio receiver, which are found in competing devices like the Creative Nomad. Those people wanting a digital recorder or small radio will have to look elsewhere.

William Maher

Distributor	Chips & Bits Australia
Phone	(03) 9696 1911
Online	http://www.chips.com.au/
Price	\$599
In short	Great player if you can afford it.

Apple Cinema Display

Along with its groovy-looking PowerPC G3 and G4 systems, Apple has released a range of LCD screens in transparent colours that can take pride of place in any workspace. Adding to the range, Apple has released a 22in monster screen for multimedia applications.

Apple abandoned the usual monitor aspect ratio, using the HDTV standard (16:9) instead, and a maximum resolution of 1,600 by 1,024dpi. Apple claims the Cinema Display allows designers to view two pages side by side with space left over for toolbars and palettes. The aspect ratio means you can also view DVD movies in wide-screen format without having the black letterbox spaces at the top and bottom. APC found Apple's claims to be true, depending on the font and size you choose. Some sans serif fonts were read-

able down to 8 point size, while most Roman fonts needed be 10 point or larger to be legible at 100% magnification.

Despite its width, the Cinema Display is quite economical on desktop space because it's a little less than 30cm deep. Changing the angle that the screen rests at also allows you to minimise glare from overhead lights. The screen's anti-glare coating already does a good job in this respect, and APC found the screen easy to view in a variety of lighting conditions. The two front legs also leave enough space for you to store the mouse and keyboard when you're not using the PC. The display has two powered USB ports at the back.



At this stage Apple is only packaging the Cinema Display with new PowerMac G4 systems, and even then you'll be spending more on the display than on the G4 system

itself — Apple's ultimate G4 systems go for \$7,295 (still \$1,300 less than the display).

The Cinema Display also uses the new 24-pin digital visual interface (DVI) connector. Standard display adaptors take digital information from your PC and convert it to an analog signal that conventional monitors can display. LCD screens then need to convert the analog signal back to digital information in order to display it. The DVI interface eliminates these unnecessary steps and just sends digital data directly to the display.

However, several new graphics cards (such as the Leadtek WinFast GeForce 256 APC reviewed on page 40) now ship with DVI connectors, and Apple theoretically could bundle the display with a display card and sell it to owners of PowerMac G3s or even (heaven forbid) non-Apple PCs.

Josh Mehlman

Distributor	Apple
Phone	133 622
Online	http://www.apple.com.au/
Price	\$8,595
In short	Big.

CanoScan FB630U

Canon's new CanoScan FB630U is sleek, small and lightweight — quite possibly the thinnest scanner APC has seen. If you're in the market for a portable scanner, this is a good option. The fact that it is powered through the USB port is a definite advantage, because it does away with the need for a power adaptor. It weighs in at 1.5kg and the top face is only marginally larger than a sheet of A4 paper, which makes it a great attachment for a notebook user.

Boasting a surprisingly high — particularly for the price and size — 600 by 1,200dpi optical resolution (which can be interpolated to 9,600dpi), the CanoScan uses a CIS mechanism. In theory, this results in sharp images with no distortion because the actual scanning elements are just millimetres from the image itself. CIS mechanisms are smaller and less complex than the traditional CCD mechanisms, which also makes them cheaper to produce, but they still have a way to go before they can equal CCD in quality.



One other unique feature of the FB630U is the blue Start button on the front panel. This is the shortcut for operating the fax, email and copy options via the toolbox.

User-friendly image editing and text conversion software is included for both Windows and Macintosh. The imaging software was a bit tricky to understand at first, but is easy enough to grasp with some experimentation. You have the ability to perform a range of different distortions, effects and cropping styles. A photo

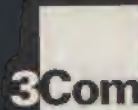
album-style thumbnail view of images is available to browse through the collection and the toolbars are well located onscreen and easy to understand.

Scanning images at 300dpi was a breeze. The same photographs scanned at 600dpi proved to be a bit time consuming, as was scanning at 1,200dpi. Colour matching was acceptable and minor details were clear. Shadows, flesh tones and colour variation didn't prove to be a major problem either — only the occasional problem of the slightly 'over-exposed' look.

Considering its size and price, the CanoScan is a nifty little bundle. A worthy candidate for home use, but still no match for a professional product.

Laura Kane

Distributor	Canon
Phone	(02) 9805 2000
Online	http://www.canon.com.au/
Price	\$249
In short	Great for the home office.



More connected.

Michael Anderson
Regional Sales Manager



7:00p.m. - still in the office. Better call the restaurant to hold my table.



I'm scheduling business trips for this quarter, and a quick holiday - I need it!



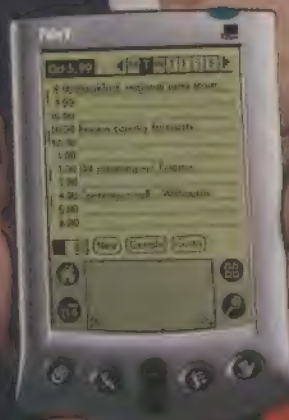
Note to myself on mortgage & investments.



Buy flowers for PA's birthday, schedule Auckland meeting.



Synchronise it all between my Palm V[™] connected organiser and my PC with one touch.



Simply Palm

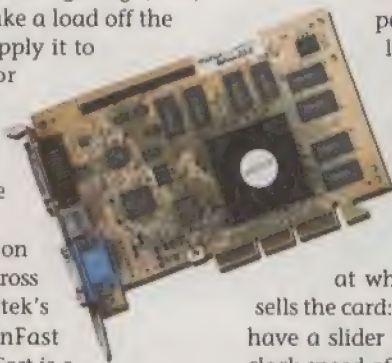
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Leadtek WinFast GeForce 256

Formerly known as the NV10, nVidia's GeForce 256 processor has been touted as something of a revolution for desktop PC graphics. It's the first consumer-level graphics chip to include a hardware transform and lighting (T&L) engine, designed to take a load off the host processor, and apply it to a custom circuit. For details on how T&L works, take a look at this month's Technobabble column (see page 150).

The first card based on the GeForce chip to cross APC's desk was Leadtek's offering, the WinFast GeForce 256. The WinFast is a 32M card based on SDRAM. Some cards will be delivered with RDRAM and should perform a little faster. It has a



VGA out, digital flat-panel interface as well as an S-Video output — but no composite.

The GeForce chip has some impressive specifications. There's the hardware T&L engine, of course, which can theoretically transform 10 million triangles per second and apply eight lights to each vertex. The card also has a theoretical fill rate of around 480 million pixels per second — a significant jump on the TNT2's 250 million pixels. The exact rates depend on the clock speed at which the card manufacturer sells the card: the Leadtek drivers actually have a slider for manually changing the clock speed of the processor and memory, but APC stuck with the default values for testing purposes. The Leadtek package also comes with DVD software, which

worked well when it worked. It was, however, hideously buggy.

It's an AGP-only card, and can operate in both AGP 2x and 4x modes.

Benchmark results

APC installed DirectX 7 and the latest drivers from nVidia on a 450MHz Dell Dimension and ran a large set of tests, including a new benchmark called TreeMark. For comparison, we also installed a Gigabyte TNT2 card in the same system and ran the same set of benchmarks.

Because the GeForce is meant to perform well on slower machines, the Dell was underclocked to 300MHz by switching the bus speed back to 66MHz (which also slows the memory access speed), and we ran the benchmarks again.

The results were mixed to say the least. In some applications — especially those

Dell Dimension XPS at 450MHz

Leadtek WinFast GeForce 256

Benchmark	Result
Ziff-Davis WinBench 3D	977.0
Futuremark 3DMark	3,685.0
Viewperf: Advanced Visualizer (fps)	59.1
Viewperf: DesignReview (fps)	16.5
Viewperf: Data Explorer (fps)	15.9
Viewperf: Lightscape (fps)	2.1
Viewperf: ProCDRS (fps)	7.8
Quake 3 at 640 by 480, 16-bit colour (fps)	62.0
Quake 3 at 1,024 by 768, 32-bit colour (fps)	55.7
Quake 3 at 1,600 by 1,200, 32-bit colour (fps)	35.3
Half-Life, 800 by 600 (fps)	35.3
TreeMark: simple (fps)	42.8
TreeMark: complex (fps)	12.2

Benchmark

Ziff-Davis WinBench 3D	884.0
Futuremark 3DMark	3,792.0
Viewperf: Advanced Visualizer (fps)	10.1
Viewperf: DesignReview (fps)	6.6
Viewperf: Data Explorer (fps)	10.1
Viewperf: Lightscape (fps)	1.2
Viewperf: ProCDRS (fps)	10.0
Quake 3 at 640 by 480, 16-bit colour (fps)	49.1
Quake 3 at 1,024 by 768, 32-bit colour (fps)	46.1
Quake 3 at 1,600 by 1,200, 32-bit colour (fps)	22.9
Half-Life, 800 by 600 (fps)	30.5
TreeMark: simple (fps)	7.0
TreeMark: complex (fps)	1.7

Gigabyte GA-660 TNT2

Result

Dell Dimension XPS at 300MHz

Leadtek WinFast GeForce 256

Benchmark	Result
Ziff-Davis WinBench 3D	783.0
Futuremark 3DMark	2,732.0
Viewperf: Advanced Visualizer (fps)	43.3
Viewperf: DesignReview (fps)	15.5
Viewperf: Data Explorer (fps)	20.5
Viewperf: Lightscape (fps)	2.0
Viewperf: ProCDRS (fps)	6.4
Quake 3 at 640 by 480, 16-bit colour (fps)	46.2
Quake 3 at 1,024 by 768, 32-bit colour (fps)	46.1
Quake 3 at 1,600 by 1,200, 32-bit colour (fps)	6.9
Half-Life, 800 by 600 (fps)	24.0
TreeMark: simple (fps)	42.6
TreeMark: complex (fps)	12.2

Benchmark

Ziff-Davis WinBench 3D	735.0
Futuremark 3DMark	2,735.0
Viewperf: Advanced Visualizer (fps)	6.8
Viewperf: DesignReview (fps)	4.7
Viewperf: Data Explorer (fps)	7.4
Viewperf: Lightscape (fps)	0.8
Viewperf: ProCDRS (fps)	7.4
Quake 3 at 640 by 480, 16-bit colour (fps)	35.7
Quake 3 at 1,024 by 768, 32-bit colour (fps)	31.4
Quake 3 at 1,600 by 1,200, 32-bit colour (fps)	14.5
Half-Life, 800 by 600 (fps)	21.7
TreeMark: simple (fps)	4.8
TreeMark: complex (fps)	1.1

Gigabyte GA-660 TNT2

Result

Test system specifications: Dell Dimension XPS-450, a 450MHz Pentium II with 128M SDRAM, 10.1G IBM-DDTA-371010 drive, FAT32 file system, Toshiba DVD-ROM SD-M1202, Turtle Beach Montego A3D running Windows 98. Tested using a Leadtek WinFast GeForce 256 or a Gigabyte GA-660 TNT2.

During the tests at 300MHz, the processor was underclocked to 300MHz. For both the GeForce and the TNT, version 3.53 of nVidia's detonator drivers were used.

3D Winbench and TreeMark were run at 1,024 by 768 in 16-bit colour. Viewperf was run at 1,280 by 1,024 in 16-bit colour. 3DMark was run at 800 by 600 in 16-bit colour.

All products used in these tests are shipping versions available to the public at the time of publication, unless otherwise stated. Winstone, WinBench and associated programs are registered trademarks of Ziff-Davis Inc. These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations as to the results.

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It'll be the end of the world if you lose your data.



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that make use of the T&L features of the card — the GeForce simply blasted the TNT2 out of the water. In a few others, it actually ran slightly slower, despite the higher fill rate of the card.

Futuremark's 3DMark test produced some interesting results. The TNT2 actually scored a little better in this benchmark, despite the superior specifications of the GeForce. 3DMark does not use hardware T&L. 3DWinMark's results, however, were more in line with what we expected from the card. The WinFast equalled our previous best score of 977 from the Matrox G400 (tested on the same machine, but running DirectX 6.1).

The Quake 3 Timedemo results are also telling (we used demo2, part of the 1.08 download, for testing purposes). Quake 3 uses OpenGL for geometry, enabling it to take advantage of many of the GeForce's features. The Leadtek card generally scored 10 to 13fps faster than the TNT2 at all resolutions (except for the one unusual result at 1,600 by 1,200, when running on the 300MHz system).

There was less differential in the Half-Life tests, with the WinFast getting about 3 to 5fps better than the TNT2. There were also serious problems with the visual quality of the GeForce in Half-Life, with a number of textures missing. We await the patch.

APC also ran the Workstation benchmark Viewperf (see 'How we tested' in the PC reviews on page 108 for an explanation of this benchmark) on the WinFast. With its heavy reliance on geometry rather than rendering, this card was expected to do well. It screamed. On Advanced visualiser it ran *six times* faster than the TNT2 using CPU-based geometry. On three of the other tests, it scored between 50% and 100% faster than the TNT2. Interestingly, though, it ran a little slower on ProCDRS.

TreeMark was a benchmark released by nVidia in order to show off how well the GeForce performs — and it does. The benchmark simply draws a tree, with dynamic lights floating around it and pans the camera around the model. An incredibly complex model, drawing the tree is a geometry-heavy task. There are two modes to the benchmark: simple and complex. The latter has more dynamic lights and much more detail in the model.

The interesting results from this benchmark are not the huge difference between the GeForce and the TNT, which was expected given the purpose of the benchmark, but the lack of difference between the results at different processor speeds. When the CPU speed was dropped, the GeForce did not lose any speed.

The wash-up

Simply put, the image quality delivered by the WinFast was absolutely superb. There were no flaws that we could detect and in 32-bit colour, images looked fantastic. It was very much on par with the excellent image quality of the TNT2.

Existing games concentrate on low polygon counts and high-fill rates, because that is what existing options can provide. When T&L accelerators become more pervasive, however, we should see games with vastly increased polygon counts and consequently much improved environments and models. For now though, the GeForce is a slight step up on the fastest accelerators currently on the market, and is likely to be blown out of the water on existing games when 3dfx unleashes the Voodoo4 — a card with a massive fill rate but no T&L.

Nathan Taylor

Distributor	Beyond Computers
Phone	(02) 9648 0777
Online	http://www.beyondcomputers.com.au/
Price	\$399
In short	A fast card, but waiting for software to catch up.

WIN



with SONY

Sony is giving you the chance to win one of 5 Sony Big Picture Prizes every time you purchase Sony Floppy disks between now and February 2000. 5 lucky consumers will win a Sony FD Trinitron Wega TV and Sony Hi Fi 6 head Stereo VCR, so get your entries in now!

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Last entry closes last mail 10/2/00. Draw Dates: 1st Draw 12/11/99; 2nd draw 3/12/99; 3rd draw 17/12/99; 4th draw 21/1/00; 5th draw 11/2/00. A.C.N. 001 215 354 NSW TC99/7522, VIC 99/2282 Issued on 30/0/99. ACT TP99/0690. H199/2296, S.A. T99/2774

There's no such thing as a free mobile

Things are about to look very different when it comes to buying mobile packages. *dingo blue*, the company that brought you rock bottom rates on long distance and Internet services is now starting a revolution in mobile telephony!

dingo blue gives you the power to create your own GSM mobile package and the freedom to roam when and where you want to.

How would you like a mobile service that has **NO fixed term contract**? Or how about a mobile plan with **low rates** — no peak, off peak — just low rates.

For 35c per minute you can call anywhere in Australia — 24 hours a day 7 days a week! And if you use our long distance service, you'll only pay 30c per minute (by the way, we strive to offer the lowest international rates in the market - check out our price guarantee at www.dingoblue.com.au).

No fixed contract, no connection or joining fees, no monthly access fee, no minimum spend and no exit fees. Just pay for the calls you make.

To see what the best deal for you is, try the mobile comparison calculator at our web store www.dingoblue.com.au. If your present plan is still the best, then stick with it - but if it's not, join us at:

www.dingoblue.com.au
1300 555 502

- NO fixed term contract
- NO connection or joining fees
- NO monthly access fee
- NO minimum spend
- One LOW RATE per minute, 24 hours a day

LOW FLAT RATES

Only 35c per minute anywhere, anytime in Australia

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blue**

Wild about
phones & the net.

Xircom PortStation

With the recent proliferation of USB devices, it's quickly becoming apparent that two USB ports just aren't enough. You have USB input devices, including mice and keyboards, USB scanners, printers, digital cameras, MP3 players, speakers and so on. USB hubs that can take a single port and turn it into many have been around for a while, but Xircom's recent entry into this field adds a new twist.

The PortStation is essentially a modular hub that connects to the PC via USB. It offers standard USB hub features — four ports and a daisy chain port — in its standard configuration, but also offers other port options. The basic package that APC looked at, the Connection Starter Kit, contained two PS/2 ports and a parallel port, making it ideal for newer systems or notebook systems lacking these ports.

One of the key selling points for the PortStation is that it's completely modular, allowing users to snap in ports as needed.

Each module has a parallel port-like connector on either side that snaps onto the PortStation, providing its own set of ports to the kit. There are a variety of module options to choose from: USB, PS/2, Parallel, plus a seven-port USB module, a serial port module, a 10Mbps Ethernet module or a 56K modem module. Xircom also has plans to release modules with four Ethernet ports, DSL and Cable modems, ISDN terminal adaptors as well as home phone networking modules. Xircom hasn't published a limit on the number of ports you can add to a single PortStation.

However, there are a couple of key ports missing — a USB audio module and gameport module would not have gone astray. Still, the PortStation does offer most other forms of connectivity.

Setting up is simply a matter of plugging it into your PC's USB port. The Port-



Station can draw power from the USB port, but the connection kit also provided an external power plug — presumably when you add a lot of modules the power supplied by the USB port is not enough.

All up, a very clever idea and well implemented. A must for anybody with too many devices for a standard PC to handle.

Nathan Taylor

Distributor	Xircom
Phone	(02) 8923 7000
Online	http://www.xircom.com.au/
Price	Connection Starter Kit: \$245
In short	A novel idea. Well designed and well implemented.

Epson Stylus Color 860

Say what you like about inkjet running costs (they are coming down slowly), the quality and speed stakes are still being raised every six months. Currently, the market seems to be settling into two camps: very cheap yet relatively slow units catering for home and SOHO markets, and more expensive yet markedly faster offerings catering for business users.

The latest business inkjet from Epson, the Stylus Color 860, incorporates all the usual photorealistic text and paper handling specifications, but claims an output speed of up to 9ppm on both text and colour. That's pretty reasonable even for a mono desktop laser — for colour, it's outstanding.

In APC's tests, a multi-font text page on plain paper came out in just under nine seconds — that's a tad less than 8ppm actual speed. It should be noted, however,

that the print spooling speed is noticeably slower than alternatives such as Hewlett-Packard. Nonetheless, this is still excellent output speed with very crisp text, even if there is a little more bleed-through to the other side than other competitive offerings.

Colour output was impressively fast. A full colour photorealistic A4 image popped out in a shade under four minutes and 50 seconds, and a mixed graphics and text page only took two minutes and 50 seconds — about half the expected average speed. Apart from speed,

another of Epson's big claims is the printer's smaller ink droplet size. It claims that ink drops down to four picolitres from the 144 nozzles, allowing much more efficient use of ink reserves, and improved print speed.



The 860's design has moved away from Epson's boxy look, and has a smoother, lower profile with a fashionably transparent lid. On the back are both parallel and USB ports, although no data cables are supplied in the box.

The printer comes with separate CMY and black ink cartridges, a sample pack of paper and a driver/instruction manual CD. Setting up is very straightforward, both in parallel and USB modes. The operation is surprisingly quiet given the speed at which the bidirectional print head has to squirt across the paper. Colour output is the usual Epson — the cream of the crop on treated paper and reasonable on plain paper, although with slightly less colour depth than some of the competition.

Jeremy Torr

Distributor	Epson Australia
Phone	02 9903 9000
Online	http://www.epson.com/
Price	\$699
In short	Neat, quiet, fast. Excellent quality on all media. If you run an office, this one should be on the list.



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Protector. Defender. Sentinel.

All cleverly disguised as the new HP Vectra.
Hosting a consortium of security features that guard your vulnerable data.

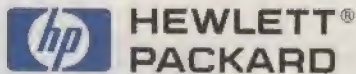
State your purpose: A Smart Card Reader verifies users.

Credentials, please: Dual-level passwording controls access to your data.

A thousand apologies, but no: Remote locking components defend against unauthorized confidential data removal.

Moral: When you want protection, hire the best.

www.hp.com/pc-au



HP Vectra Corporate PCs: Intel® Celeron™ processor 400 MHz up to Pentium® III processor 550 MHz/
Microsoft® Windows NT® Workstation 4.0/ 64 MB RAM/ Up to 13.5 GB HD/ Up to Matrox® MGA-G200 AGP graphics/
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intel
inside

pentium® III

Sound Blaster Live Platinum

Creative's new sound card, the SoundBlaster Live Platinum, offers a huge variety of sound formats including AC-3 for DVD-surround watching, 32-bit audio processing and a dynamic range of 192 decibels. It has a commendable range of speaker configurations and configurable audio theatres as well as the ability to use 32M of host RAM for voice mapping.

Output quality is excellent, aided by the wide range of output options such as standard analog, SPDIF, optical digital and CD digital. This versatility extends to inputs too, and is further enhanced by the inclusion of what Creative has dubbed the Live Drive. This is a standard 5.25in drive bay unit which fits into the front of the PC, and duplicates and extends the back panel connectivity. It offers RCA SPDIF in and out, headphones with volume control, line/mic with volume and impedance matching and MIDI in and out.

The inside of the Live Drive is also choc-a-block, with connections to the PCI soundcard itself, a power splitter input, a connection to a dedicated optical output

card, and a standard CD digital mini-DIN connector (which is also supplied on its own backplate). When you add in the usual CD, DVD, auxiliary and modem connections internally on the card itself, plus digital out, line in, microphone in, MIDI, rear speakers and front speakers on the backplate as well, it is obvious the designers haven't skimped on connectivity. There's even a bundled microphone adaptor jack and microphone.

Bundled software includes an equally generous range of games and apps.

Installation, despite the maze of cabling required, was straightforward and relatively quick. The system can be tailored to whatever speaker and room setup you have, and can be programmed with a series of preset configurations.

Once everything was up and running, however, two niggles emerged. First was the MediaRing netphone applet. This insisted on popping up and demanding to

be registered every boot. Second, in some instances it froze the mouse too.

Despite this, it is an excellent card. It's highly flexible and the front panel connector is a real boon for those that want to connect the hi-fi or a guitar without dislocating their wrist behind the back panel. Definitely worth considering if you want a better

quality soundcard, or you just want to improve your current connectivity options.

Jeremy Torr



Distributor

Phone

Online

Price

In short

Creative Pacific

(02) 9906 8887

<http://www.creative.com/>

\$599 (\$299 without the Live Drive)

Outstanding connectivity, clever integrated software controls and an innovative drive bay input solution.

R U Sure

Online shopping allows you to compare prices far more quickly and easily than conventional retailing. To make this even easier, there's an increasing proliferation of Web sites offering automatic comparison shopping. R U Sure is such a site, but has taken the concept a step further by providing a software agent which automatically compares prices as you shop and warns you if you're about to pay more for a product than you have to. APC tested a beta version of the R U Sure Shopping Agent.

Once installed, R U Sure resides quietly in your System Tray until you visit a site registered with the program, then it automatically pops up (you can switch this feature off). Once you've selected an individual product, the agent polls other

registered sites (it offers a fairly comprehensive selection) and finds the cheapest price for the product you want. Clicking on that price takes you to the site's entry point for that product. You can also do product searches directly from the agent. The program cohabited with Internet Explorer more happily than with Netscape, but worked acceptably with both browsers.

Although it's easy to operate and it polls a large variety of sites, there's a single major flaw with R U Sure, which

renders the product largely useless for Australian users: the agent can't accurately calculate postage charges. For instance, on one search the agent calculated the postage on a single CD at \$US20 — almost four times the actual price quoted by the site. This is despite the fact that you have

to provide a shipping address to help with postage calculations.

R U Sure is also unable to cope with the reality of online shopping for people outside the US, which is that you can often only save significantly by purchasing several items from a single retailer to offset shipping charges. Buying individual items (such as CDs) that are one or two dollars cheaper ultimately proves to be false economy, because the postage outweighs any benefits. While this would be less of a problem with purely digital goods such as software, these goods create relatively little ecommerce traffic. Overall, R U Sure is a neat idea, but it's of limited use for online shoppers outside the US.

Angus Kidman

Distributor

Online

Price

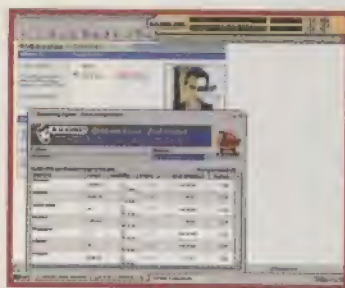
In short

R U Sure

<http://www.rusure.com/>

Free

A neat concept but a less-than-impressive reality.



Java recommendation

Congratulations on your consistently excellent magazine. You are to be commended on covering Linux long before it became fashionable — few other magazines have had the guts to publish such in-depth articles on the social and political aspects of computing.

Just a small point about your Java IDEs roundup in the October issue: you failed to mention NetBeans Developer (<http://www.netbeans.com/>), a superb product written in pure Java, which works on Unix and Mac as well as Windows. I believe it gives JBuilder a run for its money.

Brian Blackwell
Internet

Sick of spam

I remember looking in my inbox several months ago. All my mail was legitimate and was from people I know. Now, when I look through my inbox I see four messages from people I know and three with subjects like 'Make \$30,000 in only three months' and 'Cut your telephone bill in half!' I don't remember asking to be sent advice on how to cut my telephone bills. I didn't ask for any of this.

This is happening on a regular basis and there's nothing I can do to stop it. I try to unsubscribe from these mailing lists but only half of these emails with 'UNSUBSCRIBE' as the subject ever make it to their destination. Many of these mailing list servers seem to have a one-way mail server; the stuff goes out but never comes in.

So, I pose the question: Who the hell is actually responding to these ads? I figure that if no-one responded to them, they'd give up. But no, every day there's more and more emails. There are people out there to blame and I need someone to blame. Recently, just to prove myself correct, I opened a new email account at Yahoo. I requested my address to be unlisted and gave it out to no-one. After a week of no spam I thought I'd do a little test — I listed my email address to receive a newsletter from a well-respected company, and the next day I had 17

emails in my inbox from people and companies I'd never even heard of. I have come to the conclusion that spam is a plague — it's an absolute pain in the neck to get rid of. If only there was a cure that didn't require the installation of more software...

People should start writing angry letters and protesting and sending the emails back where they came from (God forbid a flood of emails would crash a mail server). Maybe then these spam distributors will get the point and leave those of us who want to use the Net — free of such nuisances — alone. BTW, keep up the great work on the magazine.

David Angelovich
Internet

A catch? Maybe not

Adrian Sutton, in 'Always a catch' (see 'Readers' Say', APC October 1999, page 48) is misinformed about telephone service charges and the ISP situation in the US. First, standard telephone service in the US does not have timed local calls from residences — we pay a flat rate for the line, and this includes unlimited time. Local calls are

timed only from pay phones, hotel phones and for limited-use plans (lower cost to low-income consumers). This is why telephone companies are now imposing an additional surcharge on multiple residential lines — they claim that Internet users are getting a free ride by making a local call to access long-distance communication. Moreover, they spend hours online.

However, those with only one residential line pay only that flat rate per month and have unlimited local call time. In the area where I live (central Texas), a number of local ISPs are alive and growing. (My husband and I use different ISPs so that if one goes down temporarily, we aren't cut off.) These typically have a basic (low-hours) and unlimited, flat-rate plan (usual cost is about \$US20 per month, though it can be lower if you sign up for a year at a time.) In my experience, novice Internet users may sign up for a 'free' ISP, but [make the] transition to a full-service, flat-rate, unlimited-hours ISP once they get their feet wet. Incidentally, I'm enjoying your magazine on a Qantas flight from Sydney to Perth.

Elizabeth Moon
Internet

Corrections and amplifications

In our recent ISP reviews (see APC November, page 80), we reported that One.Net's 2.1c access plan incurs a \$19.95 setup fee. The 2.1c plan does not in fact have a setup fee.

Our recent hard drive reviews (see APC October) stated the cost of the Maxtor DiamondMax 6800 (see page 112) as \$220, when the price (including tax) was in fact \$268.50.

APC apologises for any confusion these errors may have caused readers.

Finally, because the images of Apple's iBook (page 29) and Iomega's Zip 250 USB (page 40) in our November issue were inadvertently printed in monochrome instead of colour, we thought we'd show you what they really look like.



Apple's iBook



Iomega's Zip 250 USB

New but learning

As a new user of both computers and the Net I am finding APC a great read. Although a lot of the technical stuff is over my head, I manage to glean what I need to help me in my attempt to master this computing craze. In reference to your ISP survey (see APC November, page 124), I found it most informative and helpful. I signed up just over a month ago with Internet Primus.

I was looking for local call connection; unlimited access for \$30 per month; billing by mail rather than credit card; and seven-day, 24-hour free support. Primus was able to deliver on all of these. The support staff have been excellent. I was able to connect over the phone; the guy who talked me through the setup was great (no technobabble, just simple step-by-step instructions). After a week of being connected I was having a problem with dropouts, which frustrated me a little, so I called up Primus support and explained my problem. Once again I found the support staff willing and able to help. After a few minutes they had diagnosed the problem as an unstable connection and talked me through fixing it. It sounded a bit techy for me but I figured this guy knew what he was talking about so I gave it a go. Guess what? My problem is fixed. As for pricing; I took the unlimited 2 option, which costs me \$25 per month.

I would like to see a little more generosity in the data limit of 200M per month and the 20-minute idle time. However, when I compare Primus with others you surveyed, it is pretty good value for a home user such as myself.

Ray Hicks
Internet

More on modem 'upgrade'

I laughed when I read the modem upgrade article (see 'Service & Reliability', APC November, page 54), as the exact same thing happened to me, but with an IBM Aptiva modem. I purchased the machine in early 1998 after being informed that, yes, the modem was upgradable to 56K when the official v90 specs were released.

This was to be flash upgradable, I was told. After the v90 specs were made official, I rang IBM only to be told that technicians were working on the upgrade. Six months later, they were still developing the drivers but would send them to me as soon as they were ready. Two months later, I was told they were done and they would post them

to me. Three weeks later, I was told that they must have got lost in the mail, but I shouldn't have been given them anyway, as the modems were upgradable by sending in the old modem and paying \$170 for the 'upgrade'.

After weeks of fighting, they agreed to give me a new 56K modem, free of charge. This was duly delivered and installed — but only ran at 31,200bps max. Ah, 'must be your ISP', I was told. 'Its modems aren't compatible'. Unfortunately for him I work at my ISP, and the boss was standing next to me so I put him on to explain how the modem (a Winmodem) was at fault — not his equipment.

A few weeks of 'we don't know why' and the call was elevated to somebody who knew more than what the tech support manual stated as standard responses. Oh yes, he said, the modem needs a flash update. The disk was received a few days later, and the modem worked.

I then purchased a Gateway... vowing never to touch an IBM again.

Keiron Throssell
Internet

Apply bandwidth pressure

I enjoyed reading your article on broadband access (see APC November, page 133), but you seem to have missed the main problem with the USO (universal service obligation).

The Australian Government has set the USO for data transmissions at 64Kbps by 2001. If government (and IT advisers) had any vision, they would realise that this is only slightly better than the current standard. They should have set a higher standard as the technology to achieve these higher standards is already available. They should have set a gradual increase in the minimum standard over a period of five to six years. I suggest that by the end of 2001 the USO for data transmissions should be a minimum of 128Kbps for downloads. By the end of 2002 the minimum upload speed should be 128Kbps and by the end of 2005 the telecommunications industry should be told that the download and upload speed minimum should be 1Gbps. This would also force the upgrading of the 'last mile' by Telstra.

Only when these conditions have been met could Australia be seen as a smart country leading the Information/Knowledge Age into the 21st century.

Steve Olive
Internet

THREADS

from APC's Web sites

In October, it was revealed that Microsoft was pushing to have funding for the US Department of Justice cut. Given the ongoing antitrust case being pursued by the DOJ, this could hardly be characterised as an unbiased action on the part of the software giant. Visitors to our discussion boards certainly weren't impressed, although many viewed it as inevitable: **It would be stupid to think that any business would not do everything in its power to maintain its market advantage, so why would Microsoft be any different?**

Much discussion centred on whether Microsoft's behaviour showed it up as a company whose future was limited. Steven Marton noted:

Microsoft is the pre-Jack giant... it's only a matter of time. It'd be OK if the giant was courteous and it watched out for the little guy so he didn't step on him. But as is the case with most of these behemoth corporations, they are a law unto themselves — to their own detriment.

Others were more succinct. One anonymous poster, who we assume is a Linux user, noted:

Microsoft is a dinosaur. Ignore it and it will go away.

That raised the ire of one contributor: **An extremely ignorant point of view. Sure, dinosaurs died out, but you seem to forget that dinosaurs ruled for millions of years.**

The dinosaur debate didn't end there: **Microsoft has ruled millions of years in IT time. If you don't understand this, just think of how fast the industry moves.**

Want to put across your view, or see what other readers have to say? Join the discussion at <http://apcmag.com/interactive/> or <http://newswire.com.au/sboard/>.



P-POP
is unique to Canon.
ESS · STOP PRESS · STOP PRESS · STO

New BJC-7100 has even more refined PhotoRealism, 25 tonal levels and the plain paper advantage.

And that's only part of the story.

Because the BJC™-7100 also features water-fast printing, even on postcard type stock, is significantly faster than its predecessor in B&W and up to three times faster for photo quality colour.

But, like all Canon high definition Professional Resolution printers, the story begins with quality.

7-colour process. The BJC-7100 has a seven-colour printing process using both conventional CMYK inks, and lower density CMY inks, plus a new image processing system. The result is not self-styled "photo-printing," but a unique Canon PhotoRealism™ process.

More sophisticated colour in 25 tonal levels. The inks can be mixed and layered to produce up to 25 tonal levels with up to 90 times the colour combinations of traditional CMYK inks. The result is finer colour gradations, richer dark tones and hard to produce light shades are virtually free of pixelisation. So high quality paper produces images that are almost indistinguishable from photographic prints.

**Professional Resolution
Ultra-High Definition.**



Better plain paper performance. Then there is P-POP (Plain Paper Optimised Printing), a process unique to the new BJC-7100. It bonds an invisible Ink Optimiser to the paper before inks are applied. The inks, in turn, bond to the optimiser. Plain paper text and lines are better defined, colours are more vibrant, tones are sharper, and print-outs become virtually water fast.



Better paper handling, full bleed A4. Better plain paper use can obviously lower operating costs. It accepts virtually all paper types from plain to high gloss photo paper, has the ability to print full-bleed A4 and even accepts card-stocks at paper-weights up to 550 gsm (0.8MM).

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for Windows® 3.1x/95/98.

If you need high definition PhotoRealism, even on plain paper, you need the P-POP advantage. To learn more about the new BJC-7100, call us on 1 800 021 167.



New BJC-7100 - \$599^{RRP}

Canon



Innovation is dragging to a standstill
in the world of PCs.
By Jeremy Horey

Colour my world

"The industry sold big ugly beige boxes that took up loads of desk space. The customers were saying 'my God, I don't know how to connect all these cables', 'my God, this thing is too noisy', 'my God, it doesn't fit on my desk' and 'my God, I have to hide it when visitors come over'. iMac was the first time that a computer company had really addressed some of these issues, these challenges."

There are no prizes for guessing that this quote came from Steve Jobs, speaking at the European launch of the new G4 Macintosh in Paris.

The iMac has revitalised Apple, but surprisingly, the success of the iMac has not left all Apple dealers happy. The brightly coloured machines come in lots of five — one of each colour — and some dealers have been left holding a lot of orange machines.

This is one of the reasons why other computer companies have not rushed to release ranges of brightly coloured PCs. When beige is the only colour on offer, you don't get left with computers that you can't sell, and you don't have to keep so much inventory because one colour fits all.

This is understandable in a business where margins are under constant pressure and competition is intense. Innovation costs money and is risky. It's better to follow what everyone else is doing and stay safe. Leave the great design and funky colours to Apple.

Apple customers are not the same as those who buy PCs. Even so, there is a lot of demand among PC buyers for something that looks more stylish and that is easier to set up. The problem for PC makers is whether or not their customers would choose style and ease of use if all other factors were equal. Will following the iMac model give them a competitive advantage in the market? Is there time to find out if design and colour will make a difference in a market where manufacturers bring out

new products every nine months? Apparently the answer is no. A couple of small companies have gone down the iMac path, but have not been wildly successful.

The PC market is not innovative. Even in areas such as the design and colour of the boxes, no-one is prepared to do something a little different. The PC today looks much the same as it did five or even 10 years ago.

It may have a faster processor, bigger hard drive and a lot more memory, but all the changes inside the box are based on standards or on technological initiatives

III is only going to be marginally faster than a Pentium in displaying Web pages. The latency of the Web itself is a far more significant factor in the user experience than the speed of the processor.

On top of this, for the first time there is a very low-cost operating system that has some excellent software that isn't owned by Microsoft. Linux could provide a very good basis for a low-cost PC. It can provide all the software and Internet access that most users would need. If the machine was packaged with its own

The PC market is not innovative. Even in areas such as the design and colour of the boxes, no-one is prepared to do something a little different.

from Intel and Microsoft. The manufacturers do very little. The variations that used to exist in BIOS, motherboard and other areas have all but disappeared.

There is one area where we have seen a lot of innovation from PC makers: the distribution of PCs. First, Dell and Gateway started selling directly to the public through mail order. Then Dell went online. Other companies have gone one better, giving away PCs for free if the customer takes the advertising as well.

In this environment it is no surprise that we have not seen companies move to ultra-cheap PCs. The situation is ripe for very low-cost machines, but the established PC makers have too much to lose.

For the first time in 10 years a low-cost PC would have a chance to win a large share of the market. There are several reasons. First of all the focus for many new users is the Internet. To use the Internet, particularly in its current form, you don't need a leading-edge machine. A Pentium

modem and printer, setup and drivers would not be an issue.

Hard disks and graphics cards are cheaper than ever. The cost of memory has risen, but a low-cost PC doesn't need more than 32M and this is quite cheap.

An innovative PC maker could put together a package that would deliver everything that would be needed for less than \$600. Such a price point and a solid distribution system, combined with an advertising campaign, could bring PCs into a lot more homes. In fact, I would estimate that a large slice of those who already own a PC would be very happy to shell out \$600 to get another one.

Unfortunately, I don't think that we are going to get such a machine. PC makers are in too much of a rut to see the opportunities.

Jeremy Horey is a senior consultant with Tech Talk Australia, a division of Com Tech Online. You can contact him at jeremyh@techtalk.com.au.



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1440 DPI, Drop Modulation Technology and Individual Ink Tanks.

If you demand speed, quality and economy from your printer, look no further than the new Canon BJC™-6000.

New see-through ink tanks. What really distinguishes the BJC-6000 is the new ink tank system. For better operating economy there are individual see-through ink tanks for all colours. Each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.

The think tank system. Each ink tank has a prism moulded into the bottom. A beam of light measures ink status, and a monitor in the printer driver keeps users up to date on the amount of ink remaining in each cartridge.

More life-like colour. An all-new driver emphasises colours as they are perceived by the human eye. The result is natural colours with more subtle variations in dark shaded regions, and better gradations in high-lighted areas. PhotoRealism with a six-colour ink system and Drop Modulation further enhance quality, even on plain paper.

1440 X 720 dpi. Drop Modulation Technology™ generates droplets around one-third the size of conventional

droplets giving you high resolution printing at 1440 X 720 dpi. The result is a sharper image with smoother tonal gradations.

Sharper Black Text. Drop Modulation Technology is now available for the first time with a black cartridge to help eliminate grain in text. At the same time newly developed black ink gives sharper, clearer text with improved water resistance.

New, high-performance engine. An innovative new engine design provides the fastest print speeds, in both black & white and colour, of any Canon Bubble Jet printer.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are

available for Windows® 95/98/NT and an optional USB conversion kit is available with drivers for Windows 98, iMac and Mac G3.



If you are looking for performance and economy, you've found it in the new BJC-6000. For more information please call us on 1 800 021 167.



New BJC-6000 – \$549^{RRP}

Canon



Now might be the time to ditch stocks in Internet startups in favour of inkjet printer companies.

By Helen Dancer

From PostScript to PDF

The past couple of years have seen Adobe Systems make the concerted transition as a company from a traditional print publishing mindset to a write anytime, read anywhere paradigm that shows impressive acuity.

At Seybold's March publishing conference in Boston, Adobe unveiled its InDesign software, long heralded under the codename K2 as the new generation publishing software and the answer to the complexities of the multiple media publishing environment.

The atmosphere was like a revival meeting of the Apple faithful. When you remember that the most passionate among the Adobe community are Mac users and that each of the companies have long praised the strengths of the other as perfect partners, it all makes sense.

Adobe's most recent foray is into products that protect the copyright of written material in the digital world. This move is both logical and complex, and very well conceived. WebBuy encrypts a work that will live out in cyberspace, and takes the potential 'customer' for that work back to the author. PDF Merchant unlocks the document once payment has been arranged and permission has been granted.

The strategy for the WebBuy/PDF Merchant family is similar to that used for the now pervasive Adobe Acrobat. The Acrobat Reader is freely available for download, and allows anyone, anywhere to access a document stored in PDF format. Adobe Acrobat is the revenue component for Adobe.

However, in both of these product offerings there's a subtle shift in emphasis from the traditional publishing model. Instead of creating a published work, printing it and delivering it, the work is now created and delivered without printing.

Adobe's CEO, Charles Geschke, notes that the role of printer is shifting from provider to user, and in the process there's a transfer of printing costs from publisher to reader. 'One button-click from PostScript to PDF' changes the equation significantly. Electronic delivery saves paper and eliminates the packaging and delivery cost burden of the information provider. The consumer is paying for the value of the information, not the costs associated with getting it to the consumer's door.

The shift, taking place so seamlessly and pervasively, is enough to make a share trader wonder if now might not be the time to ditch those Internet stocks and invest in a sure thing: printer companies.

That's fine if we're all going to be printing out as much information as we currently receive on paper once the switch to electronic delivery is complete, but I doubt that's true. I agree wholeheartedly that this shift from printing at the point of dispatch to printing at the point of

We're still wedded to the printed page . . . but that doesn't make it ideal as a delivery medium.

This begs the question of what happens to it when it arrives on the virtual doorstep.

Reading onscreen is a notoriously inefficient way to absorb information. Forrester Research's John McCarthy notes that sending someone important information via email is not necessarily the best way to convey the message; the reader's retention rate is particularly low because most people skim when they read onscreen. They're looking for the bottom line, not the detail. McCarthy maintains that paper is much more reader-friendly than a 70dpi screen.

The increase in the incidence of electronic delivery of documents has fortuitously coincided with the availability of ever cheaper, easier to use and more function-rich printers for home, small business and the enterprise. Printing on demand is the new corporate watchword. Companies deliver memos and briefing papers electronically for recipients to print out when they need them, rather than printing at the point of dispatch and filling cabinets on a 'just in case' basis.

consumption is significant, but the thought of a printing press (OK, OK, a smart small colour inkjet printer, working overtime) in every home is just not a viable alternative. Nor does it make sense in terms of how we actually consume information.

Access to the Web means that I can start my day with the latest copy of the *Wall Street Journal* without having to wait, and I can skim heaps of stories every day, without the urge to print out a single page.

The shift in the publishing paradigm that Geschke outlines is really about paring down the volume of information we get to the bits we want, rather than the bits other people think we need, or should read.

We're still wedded to the printed page as a consumption medium, but that doesn't make it ideal as a delivery medium. Storing stuff on silicon rather than on paper makes so much more sense.

Helen Dancer is the editor of the *Bulletin's* e-bulletin section. You can contact her at hdancer@acp.com.au.

1440 dpi
up to A3.
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1440 DPI, PhotoRealism, richer blacks, exceptional speed, plus independent cartridges.

The idea of a dual cartridge system has existed for awhile. But needless to say, some systems are better than others. The new BJC™-5000 proves this point.

1440 dpi with variable ink drop sizes. Both the standard colour and optional PhotoRealism™ cartridges use Canon's Drop Modulation Technology™ with variable drop sizes in resolution up to 1440 dpi. The combination delivers smoother colour gradations and far less "grain" on virtually all paper types.

New dual-cartridge system enhances performance. Then, a special dual cartridge system lets both cartridges act independently to complement each other. In "split-page mode" identical black or colour cartridges can effectively double print speeds. Or, using different ink types you can produce exceptional quality effects, with the printer automatically identifying and using each cartridge for the desired result.

90 times more colour combinations. For instance, PhotoRealism inks can be used with conventional inks for a seven-colour ink system, with multiple ink densities per pixel for up to 90 times the colour combin-

ations of conventional CMYK inks. Combined with Drop Modulation Technology the result approaches silver halide quality reproduction.

An all-new approach to black. It uses new, black ink that is blacker than conventional ink. As a result, black & white documents have an exceptionally high degree of finish. Two of these cartridges (BC-23) are included in the box, and may be used simultaneously.

**Professional Resolution
Ultra-High Definition.**

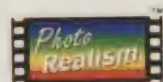


Superior Photographic Reproduction
The BJC-5000 combines several technologies designed to give you advanced photographic reproduction. There is resolution up to 1440 dpi, dual drop sizes produced by Drop Modulation Technology, and PhotoRealism featuring multiple colour ink densities for layered colours using a seven-colour system. The results are stunningly clear. Gradations are smoother. Light tones such as off-whites and skin tones show virtually no visible grain. Dark tones are richer. The new black ink gives more subtle detail than different black ink.

Independent print heads can halve print time.

Print up to A3. Both standard and PhotoRealism inks may be used on all A4 paper types. It will also print up to A3, and supports banner printing to the equivalent length of 6 A4 pages.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by unlimited hot-line support. To learn more call us on 1 800 021 167.



New BJC-5000 – \$399^{RRP} including 3 cartridges.

Canon



It's possible to carry out all kinds of transactions online — but is it any easier?

By Cathie Kennedy

Infiltration or transformation?

The Internet, some will have you believe, has transformed our personal lives and revolutionised the way we do business. In a few cases this is probably true. For example, in the July issue of *APC* I wrote of the extraordinary success of Federal Express' electronic commerce strategy. In just one day the company has one million customers online, moves around 3.5 million packages, and conducts around 63 million electronic transactions. This would not have been possible without the Internet. There are probably dozens of similar success transformation stories.

For every success story, however, there are thousands of uninspiring examples of business on the Internet. I recently booked accommodation online through a well-known chain of hotels. It took a little more than 13 minutes from the time I logged on until finally hitting the submit button. I received an email confirmation almost immediately.

In the comments box I requested a baby crib and a non-smoking room. My confirmation email ended with the message, "Your comments have been forwarded to the hotel, who will discuss your requirements upon check-in." At a pinch, I could risk not being assigned a non-smoking room, but I needed to know beforehand if the venue could supply a crib.

As it happens, a few days later I needed to alter the dates of my reservation. Returning to the Web site I was unable to find a facility to do this, and decided to call the hotel directly. It took just five minutes to call directory assistance for the phone number, contact the hotel and finalise the booking. In addition, I asked about my special requirements, and the reservations clerk was able to confirm that both requests would be filled.

The phone was a faster, more responsive and more productive medium, and I've found this to be the case with similar services. After one attempt at paying my mobile phone bill over the Internet, I resorted to paying by telephone. Also, because my bank is situated opposite my office, I find it much easier to walk across the road and carry out transactions physically rather than navigate my way through the cumbersome ebanking site.

The words revolutionised and transformed suggest some kind of metamorphosis, which I believe is a little too charitable for the current iteration of many Web sites. Sometimes I suspect we use the Web because we can, not because it's more productive or more efficient. I'd argue that the Internet has *infiltrated* rather than *transformed* our lives. That's not to say it won't happen eventually, but organisations need to find ways to add value through their Web sites that would not otherwise be possible.

Those who simply take their earth product and make it virtual are short-changing themselves and their customers, and are certainly not making the most of their investment. Retail is a classic example. Check out any number of clothes outlets online and you'll find nothing more than an electronic catalogue.

Think a little creatively, however, and organisations can add functionality that will begin to revolutionise their business and transform the life of their customers. How would you like to visit an online shop that allows you to add your profile with your size, height and colouring? You may have a scanned photograph of yourself in your personal database. You could select clothes and drag and drop them onto the model of yourself. There may even be an online colour-coding system that helps you select the shades that best suit your

complexion, and like a real shopping experience, you could email the clothed model to your friend for a second opinion.

If a site had that level of functionality, could deliver the goods to my door within 24 hours, and offered an unconditional seven-day money-back guarantee, I would shop online. However, an electronic catalogue won't motivate me.

There is one area where I think the word revolutionised can be applied to the Internet, and that's communications. Many organisations are using the Internet to communicate in ways that otherwise would not be possible. The Australian Computer Society, for example, has been trialling the delivery of virtual professional development events live over the Internet to service its members in remote parts of Australia. Remote viewers need a relatively modest PC running Windows 95 or 98, and a free downloadable copy of RealPlayer. A PowerPoint presentation is available on the Web site prior to the event. At the end of the session, participants can participate in a live Q&A session.

When you look at this and similar examples which use the Internet as a communications vehicle, you can see that we've come a long way since the 13th century technique developed by the early pioneer of fast transmission, Genghis Khan. Khan would have horses positioned every 20 miles, and when messengers wore out one horse they'd jump on the next. They rode two hundred miles a day.

I'll agree that the Internet has revolutionised communication, but it has not quite reached the stage where we can claim it has transformed businesses and our personal lives.

Cathie Kennedy is a former editor of *APC*. She can be contacted at ckennedy@ozemail.com.au.

Australia's most popular printer for home and small offices combines exceptional value, with outstanding performance.

Use 75% less ink. Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works for both black and white and colour. Combined with an optional high capacity, black ink cartridge, it can print up to 2400 pages in black and white, and up to 400 in colour using standard inks*. That's anywhere from two to five times the output of any direct competitor!

Photo quality printing. There are three colour print modes – Normal, Fine and Photo. Photo mode emphasises highlights and contrasts, and improves half-tones by producing richer blacks. Or, using the optional black ink cartridge, you can convert the BJC™-265SP to a fast B&W printer.



Brilliant colour, super economy, optional PhotoRealism, better Internet printing,

all for just \$149.

Optional PhotoRealism™ To this Canon adds the option of PhotoRealism inks, for photographic reproduction approaching silver halide quality. It produces up to four times the colour combinations of conventional CMY printers, for smoother colour gradations and more accurate colours in skin tones and other light shades.

Better Internet images. Image Optimisation takes low resolution Internet images (typically 72 dpi), and prints them at the highest resolution supported by the printer to reduce jagged edges and pixelisation.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support.

Drivers are available for Windows® 3.1x/95/98 and Windows NT.

The BJC-265SP offers exceptional operating economy plus high quality colour printing, for just \$149. For more information call 1 800 021 167.



BJC-265SP colour Bubble Jet™ printer – \$149^{RRP}



Canon

* Based on 5% page coverage for B&W and 7.5% coverage for colour, Super Economy not available with PhotoRealism inks. Price shown is the recommended retail price including tax. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet and PhotoRealism are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd, ACN 005 002 951.

Can you get a better deal buying
a PC online?

Getting connected

Companies such as Dell and Gateway specialise in direct marketing and have been selling PCs over the Net for nearly as long as the Net has been a commercial phenomenon. Dell, for instance, currently claims sales of more than \$US30 million a day through its Web site. However, the top-tier PC manufacturers have been a little more reluctant to embrace online sales. This is not because they don't think there's money to be made, but because by selling online they risk offending their reseller community and thereby sacrificing revenues.

The problem is particularly pronounced in Australia, where a limited population means that losing a large percentage of reseller sales could seriously damage a vendor's bottom line. This year, however, a fair degree of that nervousness has dissipated. Both Compaq and Hewlett-Packard have launched online stores aimed at the Australian marketplace, although each has emphasised that they are not abandoning the reseller channel.

To complement APC's annual December PC review (see page 88), Price Watch decided to see just how easy — and how

cheap — it is to purchase a PC online. For the purposes of this exercise, we decided to examine the direct sales offerings from six major manufacturers: Apple, Compaq, Dell, Gateway, Hewlett-Packard and IBM. (There are clearly many other ways to purchase equipment online, including resellers which offer online sales and electronic auctions, but we didn't include these for reasons of space.)

We sought prices for the cheapest basic PC. Our only requirements were that the PC was an entry-level model; that it was suitable for home use; and that it included a bundled monitor. We didn't specify any requirement for modems, extra software or multimedia equipment, but we removed any included network cards before calculating the price.

While there's some significant variation in the prices, every company managed to come up with an entry-level system for about \$2,000. The price variations were largely due to differences in specification, such as reduced memory capacity, processor speed or drive space. However, most sites allow for these components to be upgraded.

About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept responsibility for errors or omissions. The responsibility rests with sales staff to provide adequate information, as their employer would expect them to do with every customer. Readers are advised to always obtain a written quotation prior to making any major technology purchase.

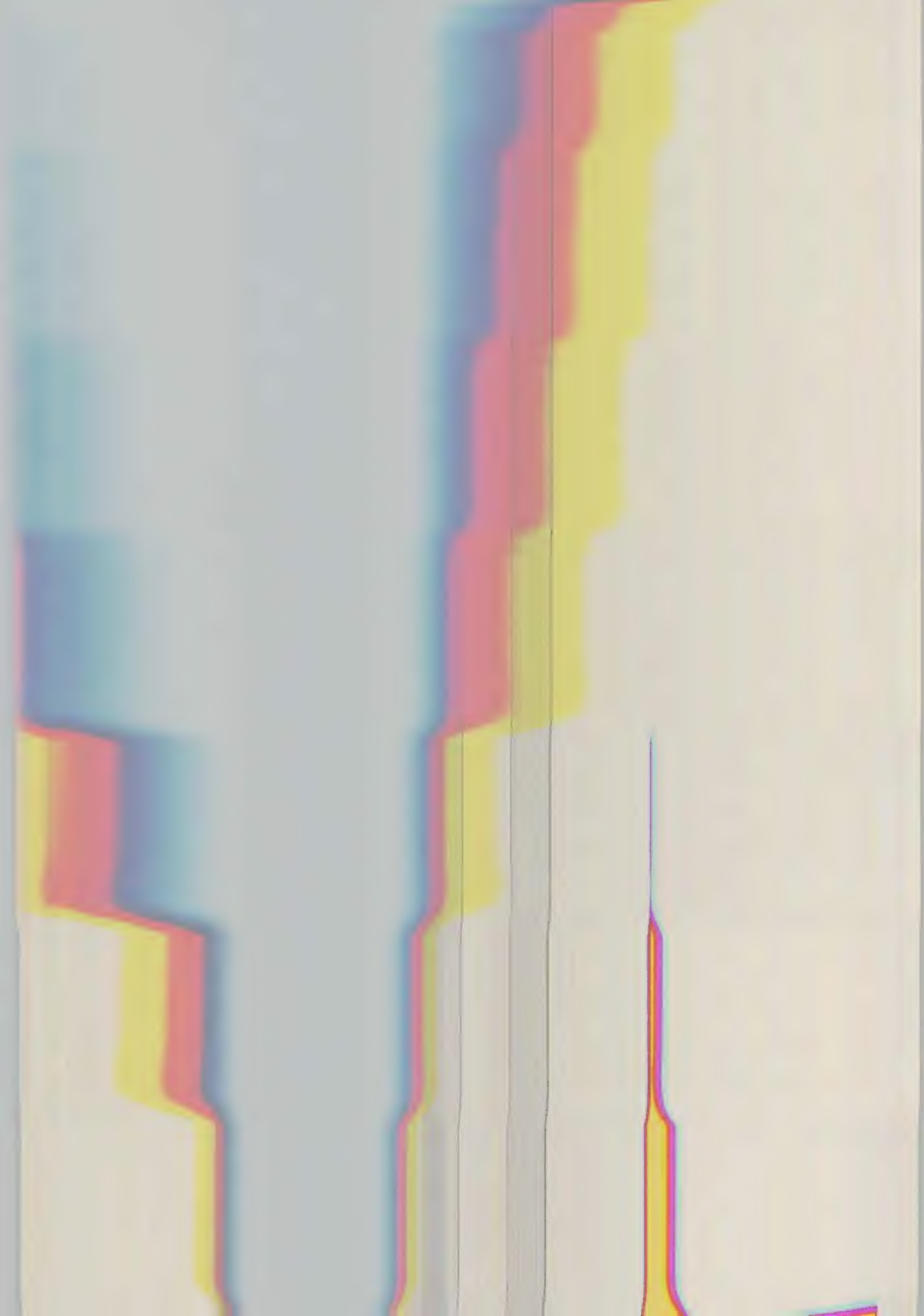
Clearly, buying online is not the best way to get an ultra-cheap PC; check the small ads in the back pages of any newspaper and you'll find systems much cheaper than this. However, if you want the reassurance of purchasing from a brand-name vendor, then going online may well get you a better deal than buying through a retail chain.

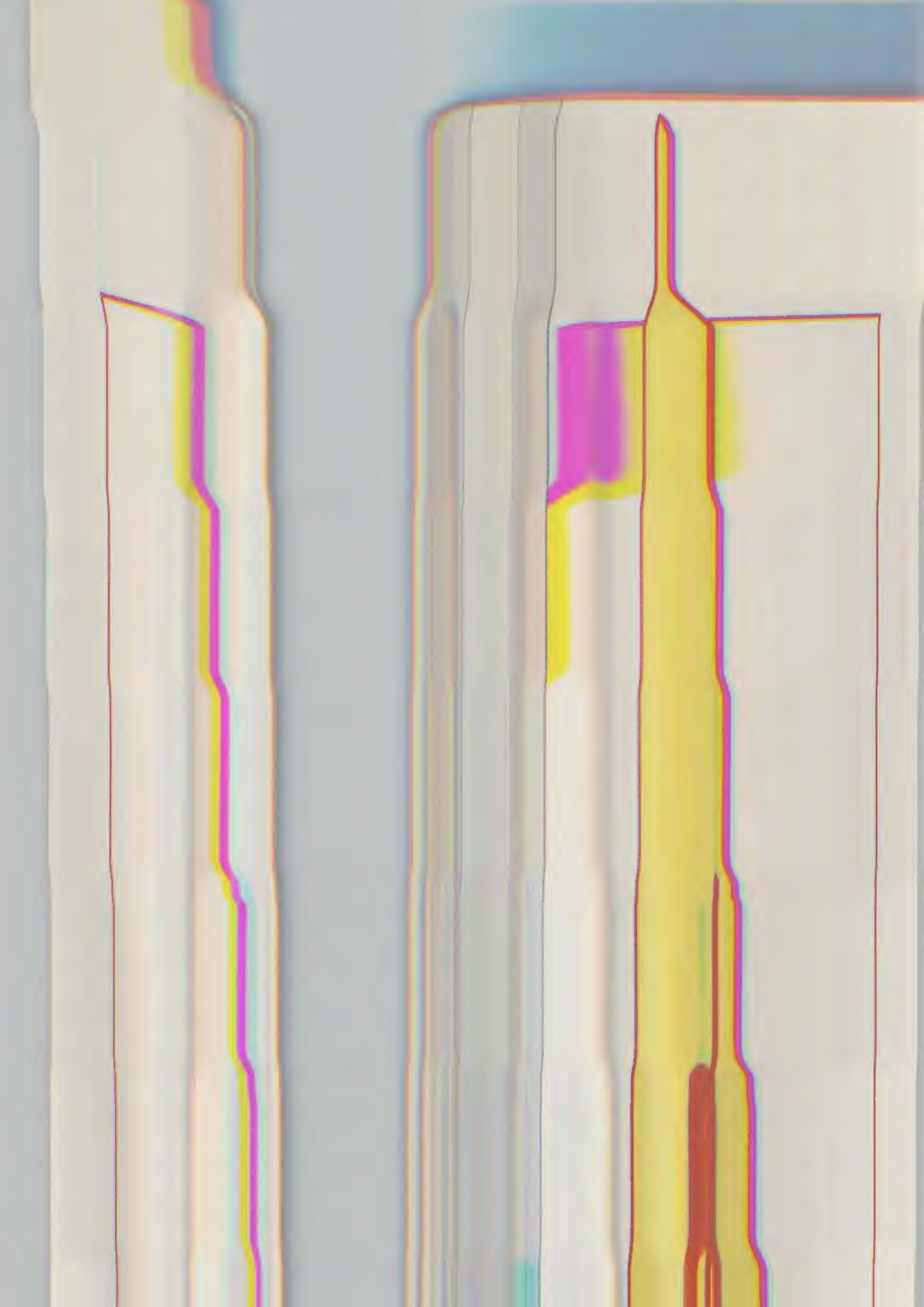
While pricing options don't vary widely, the quality of the interface does. The 'all-in-one' nature of Apple's iMac led to a simple, step-by-step buying process — the biggest challenge was selecting the case colour. In contrast, Dell's well-developed site allows virtually every option on the machine to be changed, and prices are automatically recalculated when you are doing this. Both approaches seem appropriate for the target market (beginner users for Apple, PC enthusiasts for Dell).

By the time you read this, the prices and options on offer are likely to have changed. PC technology evolves so fast that there's little point in doing price research unless you are seriously committed to buying at that time. If you do want quick, easy ordering and a reasonable price, buying on the Net is definitely an appealing option. ■

Buying a PC online

Company	Contact	Price	Processor	Memory	Drive	Monitor
Apple	http://www.apple.com.au/store/	\$1,995 (iMac)	G3 350MHz	64M	6G	15in
Compaq	http://buy.compaq.com.au/	\$2,080 (Prosignia Desktop 320)	Celeron 466MHz	64M	9.16G	15in
Dell	http://www.ap.dell.com/au/	\$1,654 (Dimension L)	Celeron 433MHz	32M	4.3G	15in
Gateway	http://www.gw2k.com.au/	\$1,599 (Essential 400C)	Celeron 400MHz	64M	6.8G	15in
Hewlett-Packard	http://www.buy.hp.com.au/	\$1,899 (Pavilion Home PC 4415)	K6/2 400MHz	64M	6.4G	15in
IBM	http://www.ibm.com/shop/au/	\$2,086 (Aptiva 25A)	K6/2 450MHz	64M	6G	15in







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and NCS 005 002 951
CS 3411

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Super Economy in
colour and B&W

\$199
Value, Value, Value.
STOP PRESS · STOP PRESS · STO

PhotoRealism and Drop
Modulation Technology

Super fast blacks

Whether you judge it on features, performance or price, the new BJC-2000SP is amazing value for money.

The new BJC™-2000SP proves that beauty can be more than skin deep.

Because it was also designed to deliver high-speed blacks, superb photographic printing, superior operating economy and even offers optional scan/copy/fax functions – all for an incredibly low price. And that's just for starters!

Introducing Automatic Image Improvement.

Canon has developed a way to automatically improve less than perfect digital images, without needing colour balancing and re-touching. It's called Photo Optimiser. This new, selectable driver function automatically adjusts for defects in exposure, highlights and shadows, without affecting the original file in the computer.

Brilliant colour. To further improve images, Drop Modulation Technology™ with dual drop sizes for smoother colour gradations works on all paper types. Then, for the gold standard in photographic reproduction, Canon's PhotoRealism inks¹ vary the saturation per pixel so that a single dot could have

0%, 33%, 67% or 100% of a colour. This produces up to five times as many colour combinations as conventional CMYK inks, with better half-tones and almost no visible grain, even in areas of low colour density.

Better operating economy. Super Economy mode reduces ink consumption by up to 75%, and works in both black and white and colour. It can print up to 3600 pages in black text, and up to 400 in colour.² And because the standard inks are optimised for low-cost plain paper, you can keep the cost of your everyday printing needs to a minimum.

It's even a scanner. The optional IS-22 scan head allows you to turn your printer into a colour scanner in seconds. It scans colour images up to 360 dpi and documents for fax, OCR and copying functions with the appropriate software.

Canon Customer Care. Canon Australia supports the BJC-2000SP with a one-year warranty, upgradeable to three years for minimal cost, and is backed by Customer Care hot-line support. For more information call us on 1 800 021 167.

Optional IS-22
scan head fits into
print head slot.



New BJC-2000SP colour Bubble Jet™ printer – \$199^{RRP}

Canon

What do APC readers really think about their Internet service providers?

By Roulla Yiacoumi

Both sides of the story

Last month, we brought you the results of APC's annual ISP Service & Reliability survey. As part of that survey, we asked readers to give us their honest opinion about their ISPs.

As you will see from the comments below, it's remarkable how different users

can have completely different experiences with the same ISP. In this roundup, we publish some of the positive and negative comments.

Do you have any comments you'd like to add? If your ISP deserves a mention

for whatever reason, email Service & Reliability at service@acp.com.au or write to Service and Reliability, APC, PO Box 4088, Sydney, NSW 1028. For a complete archive of APC Service and Reliability columns, see <http://apcmag.com/service/>.

What APC readers say about their ISPs

"As soon as you have to deal with OzEmail's customer service you may as well open your fridge and talk to the jar of Vegemite."

Ashley Wolff
Williamstown, Vic

"I do not like One.Net reducing my time credit in 15-minute (minimum) blocks."

Bob Peterson
Blakehurst, NSW

"I use Megabytes Communication. I have not been able to get my email for the past three weeks, I can go days without getting a response when dialling in, and there is no notification of downtime."

Chris Palfrey
Helens Park, NSW

"Due to recent takeovers [Chariot has made], the speed and quality of Chariot's service has been dramatically lowered."

Daniel Scanlan
Largs Bay, SA

"I doubt Highlands Internet will stay in business long, as it has no idea when it comes to basic customer service."

Joanne Crichton
Mittagong, NSW

"When something happens to Trendnet's computers, [it] ignores my calls and emails."

George Ngu
Isaacs, ACT

"Optus is definitely a 'buyer beware' ISP."

Brian Ashe
Thurgoona, NSW

"Coolgold is the worst ISP I have ever used. Not only was the connection terrible but the customer service was disgusting."

Melanie Malone
Coolangatta, Qld

"I will never ever give my credit card to OzEmail. I'm still waiting for a \$12.95 refund from 1997."

Heinz Peter Schulte
Meadow Heights, Vic

"One.Net has more recorded messages than I have heard in my whole life."

Kris Treagus
Geelong, Vic

"Microplex was absolutely awful. It was almost impossible to get through before midnight and the line frequently dropped out."

John Yeo
Glen Waverley, Vic

"Chariot is more concerned about taking over other Adelaide ISPs than its long-term customers."

Simon Cheers
Cownadilla, SA

"One.Net charges high fees for technical support and I was expected to buy a tech support ticket when I could not even set up my account."

Morrison Hung
North Sydney, NSW

"AOL was a joke in terms of speed. Its front-end program is very annoying and poorly implemented."

Mark Olsen
Ferntree Gully, Vic

"One.Net must have the worst billing system in the whole world."

Matthew Jackson
Naremburn, NSW

"First Link is excellent. I have never had a busy signal, and the service is speedy and cheap. It simply provides a service without the propaganda."

Craig Avery
Merewether, NSW

"Primus is the best ISP I've used. It has great pricing, good speed, free '24 by 7' phone support, 10M of Web space and very rarely do I get a busy signal. My Net access is billed to my Primus phone account."

Adrian Burton
Gaven, Qld

"I find dingo blue to be the best ISP I have found so far in regards to pricing and performance."

David Rowlands
Morphett Vale, SA

"Fast Access Network is the best value on the Gold Coast. It has the only tech support guy, Nick, who actually knows what he's doing. Its customer staff are great and the total package is very professional."

Colin Walters,
Burleigh Heads, Qld

"TPGI is quite good. I pay upfront for three months access so I can easily control my budget."

David Thomas
Keperra, QLD

"I am more than happy to pay a premium for Big Pond's superior service and performance."

Alex Mayo
Newtown, NSW

"Hermes Internet provides quality customer support, reasonable prices and no hidden charges."

Tim Herborn
Blackheath, NSW

"Chariot Internet has really understanding and patient staff. They realise that not everyone is technically minded and explain technical terms in a respectful, non-patronising way."

Mandi Lowe
Craigmore, SA

"I am 50 years of age and don't have great computer know-how. Austasia treats me as if I am important to them."

John Cook
Lara, Vic

"Small ISPs such as Zeta will not die out. They offer something the large players do not — it's called service."

Rodney Haywood
Dundas, NSW

"With Netspace you feel more like a member than you do with major ISPs like OzEmail and Telstra BigPond Home."

Richard Ellis
Hawthorn, Vic

"OzEmail OzMega-Saver is the best value for money plan I have used."

Michael Scott
Essendon, Vic

"Rocknet provides excellent customer service and faultless connections. When you call, you know you won't get answered by a machine."

Mark Knipler
Yeppoon, Qld

"Hypermax provides a quality, well-priced service to the south-east Queensland country areas. Its customer service is very professional."

Peter Gooding
Toowoomba, Qld



Canon BJC-80
\$399^{RRP}

Canon BJC-50
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On the small side there is the BJC™-80. It is a fraction of the size of a briefcase. Yet, with its in-built sheet

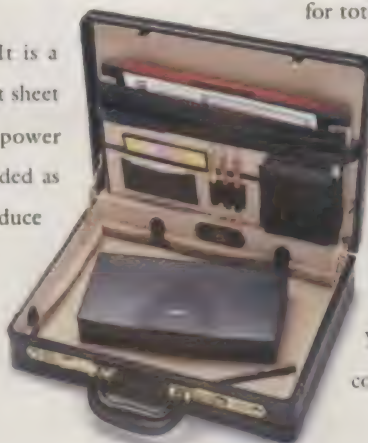
Drop Modulation Technology.

feeder and power adaptor included as standard, it is designed for people who have to produce high volume output from a very small printer.

Conversely, if size is critical, there is the brand new BJC-50 with in-built battery. It's not just small, at approximately half the size of the BJC-80 it's absolutely tiny.

Equally impressive, their performance is as big as their size is small.

Using Canon's advanced Drop Modulation Technology™ you can print everything from colour charts, to high quality photographs. Or, in seconds you can convert to extra high-speed black and white for finished business documents using the dedicated black cartridge with 128 print nozzles!



The BJC-80 fits in approximately half the space of a briefcase. The BJ-50 is approaching 50% smaller still.

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For greater portability, both models include an infra-red port for totally cable-less communications with any suitably equipped Windows® 95/98 notebook or PC.

And, if you really need the functionality of an office in the space of a briefcase, both models will accept an optional colour scanner head in place of the print

Cable-less communication.

head. It takes only seconds to change the heads. You can then use the scanner head to acquire colour images, or for fax and OCR functions.*

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for DOS, Windows

3.1x/95/98 and Windows NT.

If you need help choosing between small, and smaller, give us a call on 1 800 021 167.

Canon portable colour Bubble Jet™ printers

Canon

Can the legal system keep pace with technological change?

Catching our legal breath

In ecommerce circles the law has often been criticised for not keeping pace with technological developments. At the same time there has been some interesting international developments which demonstrate that the law is not limp or incapacitated.

The United Nations secretary-general recently stated that the laws of individual states will become less important as international rules, standards and cooperation become more important with the continued development of the global village. Despite resistance to IT law reform by interest groups which argue that reform is moving in the wrong direction, international initiatives have been making remarkable progress in laying a stable legal framework for ecommerce in

the next millennium. The impact of these international developments can be seen in Australia.

Earlier in the year the Victorian Government shot out of the blocks, introducing legislation relating to electronic transactions and data privacy. This appears to have put some pressure on the Federal Government to introduce the Electronic Transaction Bill and consider 'light touch' data privacy legislation. These developments were a consequence of international moves to introduce uniform ecommerce and data privacy laws globally.

Internet tax is one area that lawmakers will not ignore. OECD countries are currently debating the Internet tax issue. They are considering whether goods bought over the Internet should be taxed at the source of supply or at the point of consumption. The US is already considering what to do when the three-year moratorium on Internet taxes under the Internet Tax Freedom Act expires on October 21, 2001.

Another key international issue is the right of a particular government or court to impose local laws on Net users (see *APC* November, page 58). Difficulties in this area have resulted in greater regulatory activity at an international level. There are many examples of this trend, such as the regulation of domain name allocation by a truly transnational body, ICANN. This has been closely followed by the World Intellectual Property Organisation (WIPO) recommending the adoption of standard international rules for the registration of domain names and dispute resolution (including online dispute resolution).

Australia has also witnessed the strong international influence of WIPO reforms, which are directly responsible for Australia implementing reforms to its copyright law in the form of the Copyright Amendment (Digital Agenda) Bill. Australia's international obligations also led to the introduction of the Copyright Amendment (Computer Programs) Act (which permits copies of programs to be made for the purposes of error correction, making interoperable programs and security testing). This timely legislative move may allow people developing interoperable

programs to avoid the debilitating effects of the High Court's decision in the *Data Access v. Powerflex* case.

Cross-border litigation may become easier in the future if the draft Hague Convention on the Recognition and Enforcement of Foreign Judgments is ratified. It would allow a judgment from a court in one country to be enforced in another. This will be an important mechanism in the digital age.

Many informal international relationships are springing up on the Internet as regulators around the world cooperate to uphold minimum standards on the Internet. In October the Electronic Enforcement Unit (EEU) was formed by members of the International Organisation of Securities Commissions so that members, such as the Australian Securities and Investments Commission, could share information that "might benefit other regulators".

However, the push by US developers for the adoption of the latest version of the draft Uniform Computer Information Transactions Act is not a cooperative effort. The draft act favours software developers' rights over consumers' rights. For example, the draft act would enable a vendor to restrict a consumer's right to sue for a defective product, donate a product to charity, use the product, or even publicly discuss or criticise the product.

If passed, it would have significant effects on the way information or software transactions are conducted over the Internet because many software providers will be based in the US and online contracts will be governed by provisions of the draft act.

While it is clear that the law is not inactive in the digital age, it is not quite up to date. However, if the current level of legal reform continues, the law will more accurately reflect the complexities of the technological era.

Leif Gamertsfelder practises at Deacons Graham & James in Brisbane. He can be contacted at leif.gamertsfelder@dgj.com.au. This column is intended to provide general information only and is not a substitute for legal advice. For a complete archive of APC Legal Ease columns, see <http://apcmag.com/legal/>.

Links

Copyright Amendment (Computer Programs) Act 1999

<http://scaletext.law.gov.au/html/comact/10/6017/top.htm>

Copyright Amendment (Digital Agenda) Bill

<http://www.aph.gov.au/parlinfo/billsnet/99173b01.doc>

Data Access v Powerflex

http://www.austlii.edu.au/au/cases/cth/high_ct/1999/49.html

Draft Uniform Computer Information Transactions Act

<http://www.law.upenn.edu/bll/ulc/ucita/citam99.htm>

Electronic Transactions Bill

<http://www.aph.gov.au/parlinfo/billsnet/99131b01.doc>

Internet Tax Freedom Act

<http://www.house.gov/chriscox/nettax/lawsums.html>

Electronic Enforcement Unit

<http://www.asic.gov.au/pdf/99-355.pdf>

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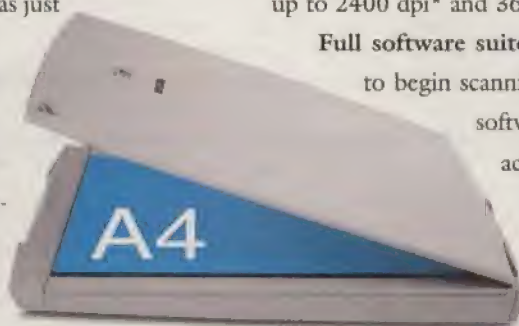
The new CanoScan™ FB 330P and FB 630P offer a choice

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Canon Customer Care. The FB 330P/630P scanners feature a one-year warranty upgradeable to three years for minimal cost, and are backed by unlimited hot-line support.

The new CanoScan FB 330P and FB 630P. You can see they are different at first glance. To learn more call 1 800 021 167.



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Canon

We'd all like to be more environmentally friendly, but other issues still come first when we purchase new technology.

How green is your PC?

Increasing environmental awareness will be singled out as one of the key characteristics of the twilight years of the 20th century. The 90s were a decade that embraced the environment wholeheartedly, not just as a passing phase but as a way of life.

The decade's other defining trend has been the arrival of the information age. Somehow though, these two seminal changes in consciousness seem to have been perceived as mutually exclusive. Sure I recycle everything in my home. My computer as well? Err... I guess I hadn't really thought about that.

Professor Ronnie Harding, the University of New South Wales' (UNSW's) Institute of Environmental Studies, believes the IT industry is ripe for a widespread commitment to the environment. "The technology moves so fast, there are an awful lot of things being thrown out," she said.

Harding believes the onus is on IT vendors to ensure their products are environmentally friendly. "The whole notion in the environment game is to think of cradle-to-the-grave responsibility on the part of the producer," she told APC. According to Harding, this ethos extends from designing products that can be reused or reformulated, to packaging them in an environmentally friendly way, to taking responsibility for their disposal once they have reached their use-by date.

As technology becomes increasingly mass market, more and more IT companies are moving to implement green strategies. Printer company Kyocera has built a reputation as being ecologically friendly—its products are specifically designed to lessen their impact on the environment. The NSW government body, Sustainable Energy Development Authority (SEDA), has been running its Energy Star program since 1996, installing efficiency features on all office equipment. Many companies are now also using refillable inkjet cartridges as a matter of course.

For its part, Gateway recently concluded a computer trade-in campaign. Those who

paid \$29 were relieved of their old computer in return for a \$300 discount on a new one. The old computer was then auctioned off and any parts that could not be sold were collected and recycled.



What prompts technology companies to adopt environmentally friendly strategies? Sustainable Solutions director Alan Pears believes motives vary. "Some businesses have clear mission statements acknowledging the environment and what they do," he said. "I think others get into it for more pragmatic reasons."

Pears believes a heightened environmental consciousness among the general population is driving more customers to demand green products from vendors, as well as the realisation that ecological initiatives can reduce overheads and increase productivity.

Gateway's trade-in deal was not borne out of any lasting concern for the environment. Instead, it was inspired by the news that many businesses did not intend to upgrade non-Y2K compliant hardware. "The environment wasn't the driving force behind the campaign," said a company spokesperson. "In formulating the campaign it became a concern."

In addition, rapid globalisation and the international nature of many technology companies is forcing them to adopt environmentally friendly policies. "All internationally based companies that trade internationally usually have an international environment charter," said SEDA's Allison Purnell.

Pears doubts whether the average technology consumer really cares about how green their PC or printer is at the end of the day. "I haven't found many IT managers doing the buying and selling [of computer products] with a strong environmental focus," he said.

Gateway certainly didn't find any strong evidence of consumer concern for the environment when it was running its trade-in promotion. "Most customers did not show that much interest in what was happening to the computer," said a company spokesperson.

The Kyocera experience is a case in point. While it has always made a point of highlighting its environmental credentials, the company found sales increased when it switched from pushing 'green is good' and moved to promoting the lower cost of running its printers. Kyocera is now ranked as the second-highest selling printer company in Australia, according to managing director David Finn.

Apple Computer corporate affairs manager Myrna Van Pelt believes that when it comes to buying a computer, technical specifications win out every time. "From an environmental perspective, consumers probably don't go into the nitty-gritty of where the product is manufactured, or its impact on the environment," she told APC. "They're interested in the end product and what the technology can do for them."

Lexmark chairperson and chief executive officer Dr Paul Curlander believes there is another reason. "Consumers are less sensitive [to environmental issues] because the amount they consume or discard is a lot less [than businesses]," he said.

Perhaps it is simply a case of educating computer buyers about the environmental effects of the products they use. Purnell said that SEDA's challenge was to encourage consumers to make the connection between the energy used by their computers and its impact on the greenhouse effect and global warming. "It takes a while to change people's perceptions and transform that into action," she said.

Cosima Marriner



Australia's new tax system — which will incorporate the high-profile GST — promises cheaper PCs, tax-free purchasing for most companies and simpler accounting practices. It also means another compliance headache for IT departments. So, what do you need to know? **Simon Vandore** presents the facts . . . plus 10 per cent.

The Sydney 2000 Olympic Games and the Y2K bug are constant reminders that we are approaching a new millennium. But the Y2K bug will soon be history and there are just nine months to go until the Olympics. While we are still adjusting to the fact that next year is 2000 — and thinking of a new name for the next decade (the naughties?) — there is one more problem facing Australians before life can return to normal and IT managers can sleep in relative peace: the goods and services tax (GST).

The Howard Government likes to point out that it's not just the introduction of a GST, it's a whole new tax system; income tax and business tax will be lower, capital gains tax will be phased out, and a consumption tax will be imposed on almost all purchases.

In a nutshell, what this means for technology buyers is that hardware prices will fall, while software and service prices will rise. The current 22% sales tax will vanish, and in its place a flat 10% consumption

tax will be applied to all hardware, software and IT services. Currently the only part of software taxed is the media on which it ships — IT services have not been directly taxed at all.

While consumers will see the price of software and services (such as Internet access) increase, most companies will be safe. Because the GST is a tax on the provision of a product or service, it turns all businesses into the Federal Government's tax collectors. The reward for this imposition is that companies can claim back the GST they paid on their 'inputs' — the capital and resource costs incurred in production.

It is a consumption tax imposed on the end user, not a cumulative cost applied at each stage of production. Effectively, this means tax-free IT pricing for most companies and a significant price cut on hardware for others, too. The price of software and services will rise in real terms, but because businesses can reclaim the GST on those purchases, the effect is short term — and it works both ways.

"If you're collecting tax now for the government and you sit on it for three months, that's a great thing for cash-flow," said Bruce McCabe, senior analyst with Gartner Group in Australia.

However, there are a limited number of industries that are input-taxed; that is, the GST on inputs cannot be claimed back. The financial services industry, which covers everything from banks to credit providers, is a primary example. Because many banks outsource their IT needs, they would have faced a 10% blow-out in costs under the original proposal, while their competitors, whose IT needs are covered in-house, would save money and be able to charge lower interest rates. Complaints about this disparity have resulted in amendments to the legislation which exempt banks from paying GST on a specific set of IT services, and more changes may follow. Other input-taxed areas include residential leasing and the sale of precious metals beyond the refining process.

There are quite a number of GST-free product categories, but those that directly concern IT include exported products, the sale of businesses, most education courses and materials, and duty-free goods bought by inbound passengers. Companies producing GST-free goods and services will be pleased to know that they can still claim back GST on inputs, despite contributing nothing to the tax office in return.

Another part of the new tax system, which should have a big impact on IT, is the gradual phase-out of capital gains tax. This should provide more incentive for investors in IT startups and the venture capital industry as a whole, particularly where money from overseas is concerned.

How does the GST work?

If you run a business and your annual turnover is more than \$50,000, you will be required by law to pay the tax office 10% GST for each sale you make, unless the product is legally exempt from GST. Presumably you will pass on this 10% to the buyer, but you may choose to absorb some of it by reducing your margins if the resulting price point is unwieldy.

Unfair price increases will attract scrutiny from the Australian Tax Office (ATO). Companies must be able to demonstrate how they calculated pricing and margins on every product, before and after the GST. Sellers cannot advertise a price and say 'plus 10% GST' — the tax must be included in the advertised price. For some goods and services there are Treasury guidelines on how much prices should rise, based on the difference between the removal of current sales taxes and the addition of 10% (book prices may rise by 4%, for example).

The amount most businesses must pay to the tax office is the difference between GST charged on sales and GST credits on inputs. Businesses which are run as a hobby or those with an annual turnover of less than \$50,000 will be allowed to choose whether or not to apply GST, but they cannot claim tax credits for GST on inputs if no GST has been charged on outputs.

The tax office requires companies to register as GST collectors by May 31. Once the tax laws are in place, it is up to businesses to follow the rules or face some significant financial pain.

"GST by definition is self-reinforcing," said Graham Penn, general manager of research for IDC Australia. "Fundamentally you pay it, and then you claim back all the inputs. If you don't have a system in place to capture all the inputs, you can't claim it back. So you pay tax twice... If you have a deficient system, which doesn't capture it, you pay the GST on all your purchases, plus you have to remit to the tax office 10% of your revenue."

The ATO requires regular GST 'returns' from business. Those with annual turnovers above \$20 million must report monthly and their first submission will be due in August. Companies with lower turnovers need to report every three months, beginning in October. A company that does not comply will be subject to a 16% late payment fee.

On the positive side, companies planning to invest in new equipment or training can look forward to a windfall. "For businesses the policy must be to delay hardware spending past July 1, 2000," said McCabe. "You can save 22% wholesale sales tax. And if you're thinking of deploying 5,000 new PCs in June next

year, you'd be mad not to delay that three weeks and realise the savings. It might take a little bit of time in some sectors, but in IT it will be almost immediate. If we look at hardware, particularly in the competitive landscape we have, the cost benefits will flow through within a week."

June is normally the peak period for IT sales as businesses complete the financial year, and consumer demand is highest around Christmas. The 1999-2000 year will be different. It is believed that many purchases will be postponed until sales tax is abolished and GST can be claimed back, while consumers may take instant advantage of the new prices in July. It will be hard for suppliers to gauge demand until it hits them, meaning they should brace themselves for the calm and the storm.

"If [a hardware company] gets caught with a few thousand laptops, which it over-forecast at the end of the quarter, that bites its profit for that quarter," said McCabe. "So [companies] always under-forecast the market, and what it means is that there is going to be an awful lot of supply disruption here because no supplier's going to get this right... If you're looking at delaying a large deployment through that period, get in the pipeline with the supplier and get supply allocation or it will be very, very difficult to get things on time."

As a consumer, you will most likely have to wear the increase in the price of all goods and services, except those designated GST-free. Consumers are basically 'input-taxed' like banks.

Continued on page 70

Tax timeline

1999

July 29	September 21	September 30	October 1
Wholesale sales tax rate of 32% reduced to 22%	Capital gains tax rules relaxed to benefit small businesses	Indexation of capital gains frozen	Capital gains tax rules relaxed across the board, some reductions

2000

November 1	July 1
ATO commences registration for the Australian Business Number and GST collection. Capital gains tax relief for takeovers	Introduction of 10% GST. New taxes on luxury goods introduced. \$12 billion personal income tax cuts (changes to all but top rate). Company tax rate cut to 34%

August 21	October 21
First lodgement date for those required to submit monthly GST information to the ATO	First lodgement date for those required to submit quarterly GST information to the ATO

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AIM HIGH
HITACHI

Continued from page 66

"Consumer prices for hardware, printers and scanners and personal computers won't come down very much," McCabe predicted. "You might save \$55, so you wouldn't delay it nine months, but you might delay it a few weeks to get that saving. Certainly there'll be so much hype in June generated around the price cuts that I expect a lot of consumers will be holding onto their purchases around then. But clearly software prices and things like ISP services and the Internet will go up 10% in real terms."

People who prefer to build their own PC may need to reconsider because 10% tax will be applied to each component. Big companies selling off-the-shelf PCs can claim back the cost of such inputs, while individuals probably cannot. While economies of scale will still make it cheaper for PC vendors to sell pre-built systems with productivity software installed, individual components will be much cheaper than before. Paying 10% tax on each component as opposed to 10% on a complete system will not make that much difference, but higher software prices will be an issue for those choosing their own.

MCCabe also notes that leasing a PC is a potential trap; contracts are probably based on current prices with wholesale sales tax inclusive. A three-year contract at current prices signed in late 1999 might look a little foolish come 2001. This also applies to the various 'free PC' deals, which translate to several thousand dollars paid over several years for hardware, software and Internet services. You should examine contracts carefully, remembering that there is a balance between avoiding the upcoming increase on Internet access and software by signing up now, and benefiting from cheaper hardware later.

Useful phone services

Tax reform infoline (general public)
13 61 40

Tax reform infoline (business)
13 24 78

GST Start-up assistance enquiries
(02) 6263 4490

ATO tax seminar hotline
1300 138 990

The IT headache

Just when we've come to grips with Y2K and many systems are 'locked down' awaiting the date rollover, along comes the new tax system. It creates another compliance problem, and the range of software able to cope with adding and subtracting 10% here and there is fairly broad. The wisest among us started work on this problem as soon as politicians raised the idea of a consumption tax, but many have only just begun their GST projects and, as with Y2K, there is an immovable deadline.

Don't blame the ATO, however. It's a matter of politics. If the new tax system was delayed another 12 months, it would be implemented far too close to the next election for comfort.

"The tax office has had to wrestle with a lot of complexity introduced by Parliament. It had to make the rules work from the legislation which was introduced by Parliament and modified at the last moment," said Penn. "So you can't blame the tax office, because it has been working as hard as it possibly can to get paper out the door to all the tax agents and accountants."

Obviously, accounting packages, transaction processing software and billing systems have to be brought up-to-date. On a small scale this may mean upgrading to a new version of Quicken or Money, but companies running more complex software will have a difficult time. In a worst-case scenario, high-end financial packages like SAP may have been implemented using the GST field for something else, meaning a great deal of restructuring is required. Australian Competition and Consumer Commission regulations state that invoices must make the pricing structure clear and that the GST must be included. Contracts must be rewritten to include GST beyond July and if this is not done, GST cannot be charged. However, Treasury will still collect 10% on all sales, which represents a significant penalty for the company involved and a huge workload to catch up.

Point-of-sale equipment must be able to determine the price of a product and whether it is exempt from GST, so retailers may have a lot of work to do. Some retailers have been slow on the uptake because they have not yet had to deal with wholesale sales tax directly. From July, their cash registers may even have to check items passing the scanner against a database of GST-free goods. Everything must be set up to cater for the Australian situation, not an overseas-style consumption tax.

Useful tax links

Department of the Treasury
<http://www.treasury.gov.au/>

ATOassist
<http://www.ato.gov.au/>

Budget 1999-2000
<http://www.treasury.gov.au/budget/>

ATO: The New Tax System
<http://taxreform.ato.gov.au/>

Treasury: A New Tax System
<http://www.taxreform.gov.au/>

Review of Business Taxation
(the Ralph report)
<http://www.rbt.treasury.gov.au/>

GST Start-up Assistance Office
<http://www.gststartup.gov.au/>

Federal Government Business Entry Point
<http://www.business.gov.au/>

"Much of the software used in Australia is GST-compliant already," said Penn. "It's just zero-rated. In other words it goes through the motions and puts zero into a bucket. So what you've got to do is GST-enable it. The hard part of that is you've got to provide for the exceptions."

Businesses also have to change their prices, which could involve anything from changing the labels on all stock, to updating huge electronic lists. Meanwhile, inputs ranging from travel expenses to capital equipment must also be tracked to save companies money when it comes to making their next GST payment. Staff must be trained to understand how the GST works and how to use the updated systems because simple misunderstandings could be quite costly.

Where it is unclear how the GST should be accommodated, industry bodies can help by suggesting a consistent standard. The only industries that probably don't need to change their accounting to a great extent are those already getting tax-free pricing.

Estimates of the cost of GST-compliance measures are as high as \$3 billion. Large companies are spending in the millions, and even small businesses could end up paying thousands for upgraded systems. Add Y2K costs and it's been a very expensive couple of financial years, but there are no other major compliance projects in sight and any government is likely to wait several years before making any more major changes. There will be

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KI-P88

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KI-R11 / KI-R21

19"/4U Rackmount



KI-P20

Removable H.D.D Rack



MH-101 / MH-103 / MH-10U2W

Micro ATX Series



KA-M90 KA-M65

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MS-686 MS-486

Phoenix ATX Series



Q4312 Q4812 Q4911 Q7113

19"/5U Rackmount



KI-P50

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amendments to the tax legislation however, just as there will be a few extra tweaks to Y2K work when the date arrives. But the parallels between GST and Y2K projects should not be taken too far.

"It's a different set of skills," said McCabe. "You can't just take Y2K staff and throw them at the GST problem. Y2K has been very much a matter of going and finding date fields, identifying them and fixing them. GST requires financial skills, knowledge of financial systems and an understanding of how the tax will work."

None of the companies contacted by APC wanted to go on record with their comments about the new tax system, but all those that sell hardware are happy that the abolition of sales tax will reduce prices, making their products more attractive to consumers. Smaller organisations seem somewhat confused about what they should be doing to prepare, blaming it on a lack of information from the ATO (larger organisations said they received adequate instructions). Service companies were the least willing to comment, but did not make any criticisms of the new system.

Complications arise when companies are involved in both taxed and GST-free activities. Gartner Group cites universities as the primary example. Although education will theoretically be a GST-free industry, these days many universities are involved in selling their services to others, and may also have a hand in providing financial or retail services on campus. Some confusion may occur in the government sector, because council rates and transactions between many government organisations will be tax free, while the services provided by most of these entities will be taxable — including financial services (such as loans and grants) provided by government.

McCabe offers the example of a university purchasing a supercomputer and trying to determine how much it is likely to be used for education, and how much for commercial activity. "For one they can claim back the GST and for the other they can't. So they have to make a percentage formula for that system — say about 30% of the CPU time is allocated to the taxable activity. So we can claim back about 30% of the GST we paid on that system."

He suggested that as in Canada and New Zealand, companies will have to come up with blanket formulas and perform regular audits, taking an educated guess at their GST liabilities.

GST and the Net

Internet access, as a service on which sales tax has not previously been imposed, is likely to be an area where prices will rise as a result of the GST. As a relatively new industry, prices should theoretically fall due to economies of scale and huge uptake, but the ISP industry and its customers will really feel a 10% increase on monthly rates.

But it may not be that simple. ISPs should benefit greatly from the abolition of wholesale sales tax on hardware and the fact they can claim back GST on inputs.

"In the past, Internet providers have had to purchase hardware such as computers, access servers, modems, desks and chairs like any other business," said Peter Knox, general

manager of Pacific Internet.

"Unfortunately, however, the majority of our costs, which is Internet access and telecommunications services, have not been taxed in the past because they are services."

The overall effect could be a slight price increase, but nothing is certain. If your ISP's service is based on a contract that will continue past June next year, GST should be written into it already. ISPs should also inform their non-contract customers of possible changes. Most Internet companies that APC spoke with were aware of this — some had put GST in their contracts months ago, but most were not yet willing to predict how individual consumers would be affected.

Other GSTs

When the consumption tax was introduced in New Zealand in 1986, the Government drafted its legislation in consultation with business. In Australia in 1998, the Government introduced legislation, thrashed it out in Parliament, and then consulted business with the Review of Business Taxation (the Ralph report). Although Australia and New Zealand's implementation period was similar (12 months), this decade is a much more complex business and financial environment with a far greater reliance on IT.

"Their legislation was very clean; it had no exemptions like food or medicines," said McCabe. "We were the only nutters that went about doing that. And our friends across the Tasman laugh at us over that. I've spoken to so many people and they've said 'how can you possibly implement it that way?'. And we're about to find out."

"New Zealand went through a period of about 18 months of agony and then it worked fine. Part of it is disabling all the wholesale sales tax stuff, which is already built into stock control systems and invoicing systems," Penn said.

Canada, which introduced a GST in 1996, has had more problems than New Zealand due to state taxes which duplicate the federal system. Fortunately in Australia, the Federal Government is forcing state governments to abolish many of their stamp duties and secondary taxes in return for a cut of the GST revenue.

One definite benefit of a consumption tax is that it is hard for anyone to hide

from the tax collector. Tax fraud should be reduced, but there are some downsides — it is difficult for the tax department to verify whether input costs being claimed are genuine, and it is next to impossible to police Internet trading or barter. Genuine mistakes will also be made, and as the ATO will also be learning the ropes, you can reasonably expect some leniency in the first few months. We may need it.

"Probably two-thirds of large Australian businesses or large organisations — that includes State and Federal Government — are not going to be fully compliant come July 1, 2000," McCabe predicted. "Now that's a big statement to make. I'm not saying they're going to go out of business or they're not going to be viable. What I am saying is that they will have lingering problems past July 1 where they're not collecting information on their inputs properly or they're not charging GST on all of their outputs effectively, then they're losing money as a result. Or maybe some of their staff aren't trained and they're making mistakes."

But once we get it right, there are long-term benefits for Australia's international competitiveness. The gradual reduction of capital gains tax should attract overseas investors away from Asia — this may even happen early, in anticipation of the changes. But the types of industry Australia attracts will probably remain the same.

"Even if we do everything, which is believed to be the intent of Parliament, some people will argue that it more or less just levels the playing field — it doesn't put you in a leading-edge position," Penn said.



YOUR ENEMIES

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"We don't see any evidence in Australia that the Federal Government is moving to introduce the sorts of tax holidays or tax incentives to capture big IT infrastructure projects. What we are seeing more is people trying to build IT services using the smart people resources we've got rather than building bricks-and-mortar incentives for the IT industry. In other words, we are using the multinational work force, the fact that we can speak English and that we're in the right time zone to service Asia. Those sorts of things will enable you to provide helpdesk or professional services, rather than fab plants or production lines, for the Asia-Pacific region."

This time next year, the new tax system will have been in place for several months. The Olympics will be over, Y2K will hopefully be forgotten and there should be some stability in Australia as the Government sits tight, letting business find its feet in a new environment. Between now and then, things will get complicated and there will be a lot of fast learning to be done. But for the IT industry, this change is for the better. ■

Counting the costs of GST

Product/service	Ex-tax	Current price	New price
Budget PC 	\$1,640	\$2,000	\$1,804
Top-range PC 	\$4,918	\$6,000	\$5,410
9.1G hard disk 	\$599	\$730	\$659
Top-end graphics card 	\$369	\$450	\$406
Basic laser printer 	\$1,107	\$1,350	\$1,218
Network starter kit 	\$200	\$244	\$220
Office suite 	\$720	\$720	\$792
Game 	\$90	\$90	\$99
Antivirus software 	\$80	\$80	\$88
Sore throat remedy 	\$12	\$14	\$14
Roast chicken 	\$7	\$7	\$7.70

Note: Prices are estimates based on average current pricing. The media software ships on is currently taxed, but this has a negligible effect on price.

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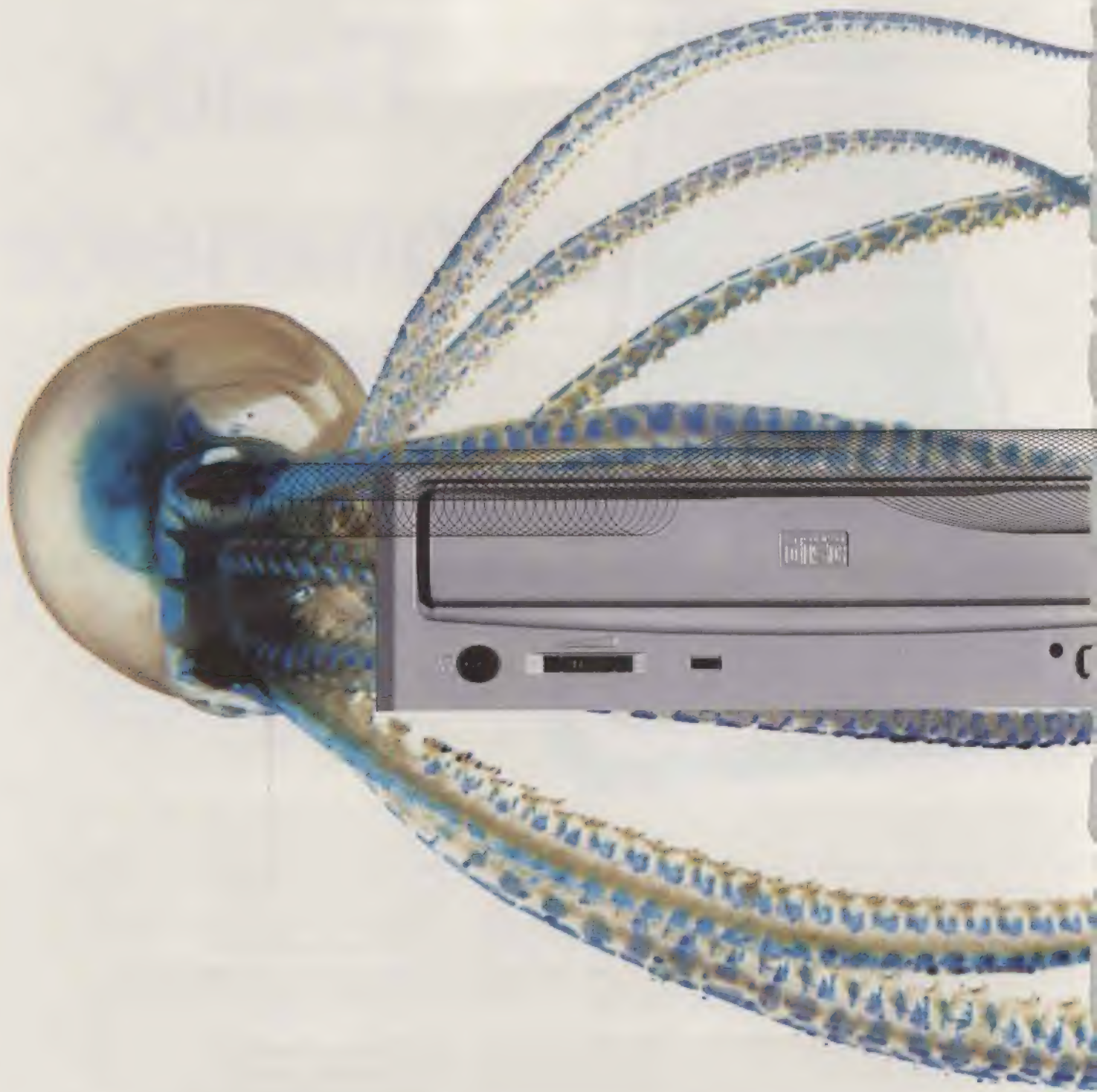
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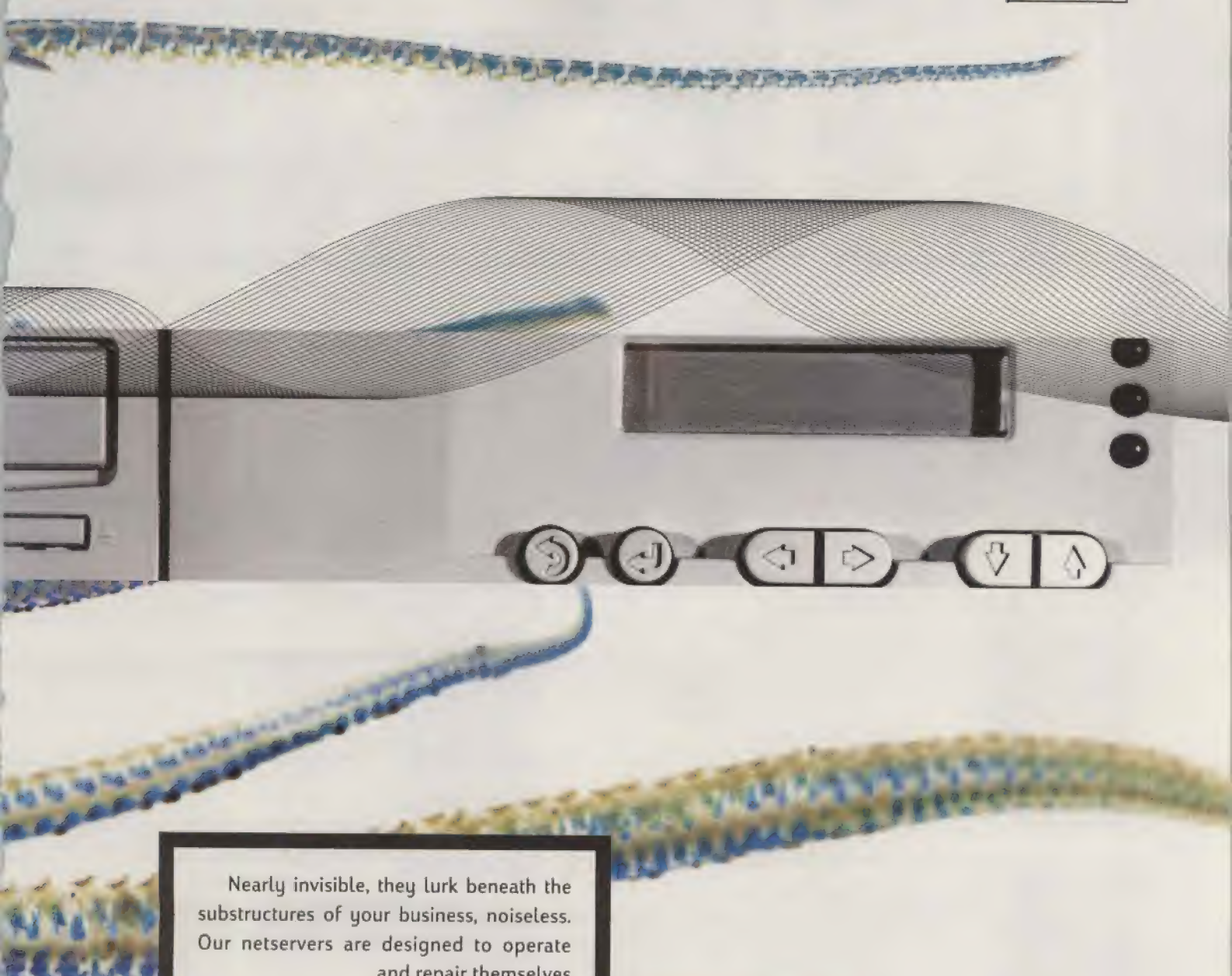


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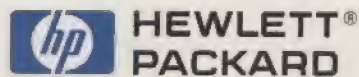
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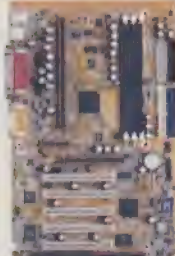
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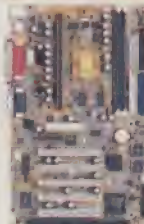
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DIGITAL DISEASE



Computer viruses are one of the most hyped threats of the technological era and have spawned a boom industry: antivirus software. New viruses appear all the time, and each is more complex than the last. But are they the threat that some would lead you to believe? **Simon Vandore** separates virus fact from virus fiction.

A computer virus is a software program, and although most software is written to assist its users, virus software is usually written with malicious intentions. It is designed to attach itself to another file or the boot sector of a disk and do two things: to create copies of itself, or 'replicate', and to cause something to happen on a computer, or 'deliver a payload'.

The first virus was developed in 1983 as an experiment on a Digital VAX. Viruses were first identified as a problem on PCs in 1987. Since that time there has been a proliferation of viruses and tens of thousands now exist, although very few are actually 'in the wild' and spreading. Most existing viruses are kept in the files of antivirus software companies, and because the viruses are known to the antivirus

software, it is unlikely they will spread. However, the culture of virus writing is to make new and better viruses to avoid detection by antivirus software, and it is these new viruses which cause concern.

Until 1996, it was generally accepted that viruses could only exist in program files, never data. This changed when Microsoft introduced its powerful macro scripting language to the applications in its Office suite. This development made it possible to enclose harmful instructions in a data file. Viruses now also include malicious macro scripts attached to data files; 'worms', which propagate themselves across networks; and 'Trojan horses', which are designed to make a system vulnerable to other forms of attack.

A Morgan & Banks Technology survey released in June reports that of 1,000

Australian companies, 52.9% suffered virus attacks in the preceding 12 months. About half of those surveyed said the viruses arrived via email attachments or the Internet, which is consistent with antivirus companies' claims that macro viruses attached to documents are now the most common threat. In fact, even as this article was being written, a Word macro virus accidentally sent by a colleague arrived in my inbox.

"Virus writers exploit the technology of the times and any weak links in it," said Frances Ludgate, marketing director with Melbourne-based antivirus house VET (now owned by Computer Associates). "The biggest explosion of viruses came when email really took off, since, at the same time, the macro language was becoming standard across the Microsoft products."

"Macros are fairly easy to write," said Robyn Ord, general manager of Australian antivirus company Leprechaun Software. "They're also easy to use for trigger dates and things like that, because they can sit there and not be noticed. There is more of a chance of a trigger date causing some disruption, than with something that actually [has to be] fixed straight away."

The increasing popularity of electronic commerce and email presents specific problems for companies, which have to tread carefully on the legal issues presented by viruses. If one company's operations are affected by a virus received from another, a damages suit could follow. Therefore, many companies have instituted strict workplace regimes, which include disciplinary action for employees who use personal disks or forward email attachments on the company network. Thin clients or PCs without disk drives are attractive options in such environments.

"Where you've got networks you can have viruses that will spread very, very fast," warned VET technical communicator Luke Hoban. "And if you've got a fairly nasty payload, which triggers pretty much immediately, then you've got a real problem, particularly if you can go back and reinfect the machine afterwards. There have been numbers of companies that have basically gone in and pulled the plug on their network connections for servers and workstations."

If you own an antivirus software package, it is vital that you keep it up-to-date. Most have downloadable virus definition updates, available every few weeks. Updates contain new data which enables the package to find and clean up the latest viruses. If you don't update the software regularly, it won't do its job properly.

"Users who have purchased our product or somebody else's five years ago come to us and wonder why they're infected," said Ord.

In an attempt to evade detection, virus authors have adopted encryption techniques. At first it was possible to trap encrypted viruses whenever they decrypted, but some of the most dangerous viruses now use polymorphic encryption where the decryption routine is random each time, meaning there is no telltale signature when they activate. These viruses pose a greater danger, so antivirus companies have painstakingly developed scanning engines that look for patterns used by the encryption technology involved and always supply downloadable updates

when something new appears. When virus technology changes, so must the scanning method.

Antivirus companies are in a difficult position. They must be seen to be squeaky clean and secure, but because their sales benefit from the existence of new viruses and customers are at the mercy of their updates, they are always under suspicion. They are often accused of developing or spreading viruses to expand their market.

"Our response is always twofold," said Ord. "We are very busy with viruses that are not written by us to even bother doing that ourselves. And our company's integrity would be seriously at stake if we were ever seen to write viruses in-house. In fact we flatly refuse to even distribute viruses — we've been asked on numerous occasions by



people testing our software if we could provide them with a couple of viruses so they can see what an infection looks like. We never ever do. Never have and never will."

Ord adds, "We were considering exporting to the Chinese market, but a proviso of being cleared to sell in China was that we had to provide a sample of every virus we detected and cured. We pulled out. If we hand it over on a disk, we've got no control over where that goes, but it's got 'Leprechaun Software' all over it. It's just not worth the risk. We wouldn't have a company left."

Know your enemy

Most traditional viruses infect COM or EXE files (commands and programs), attaching themselves to a file and executing their replication or payload routines when it is run. These viruses also usually load themselves into RAM to infect any other COM or EXE files accessed.

The most commonly found traditional viruses go straight for the boot sector of a

disk drive, so that when a drive is accessed (such as when a PC is booted) the virus is loaded into RAM first. It then proceeds to infect any other disk to which the computer has write access. Although the prevalence of boot sector viruses has been reduced now that it is rarer for files to be transferred via floppy disk, they are still a problem.

Payloads vary. Some viruses have no payload whatsoever and exist merely to propagate themselves, but others will destroy files, format or encrypt a hard drive, or create annoyances such as increasing file sizes to fill all the space on a disk or preventing the function of a vital piece of software. Some deliver pranks that are not necessarily harmful, such as popping up a message or picture from the virus author.

The Jerusalem virus, otherwise known as Friday 13th, is a well-known example of a traditional virus infecting COM and EXE files. It slows down a computer by writing itself to every program run, causing program files to get larger each time. On any Friday 13 its payload is different — any COM or EXE files used are automatically deleted.

A classic example of an old, but still prevalent, boot sector virus is Stoned.-Michelangelo. It can remain undetected for a long time, activating only on March 6 (Michelangelo's birthday), when it proceeds to delete 17 sectors at the start of a hard disk, rendering all data unreadable. Other viruses still found in Australia include AntiCMOS, which is a very simple but annoying boot sector virus that makes the PC unable to see its hard drive (though it does not damage data), and Form, which writes its own information into the boot sector of any hard or floppy disk used in an infected PC, causing bad sectors to appear.

All of the above viruses are easily detected and removed with modern antivirus software, so it is now rare for them to cause serious problems in big organisations.

Macro viruses

This new breed of viruses usually involves the Microsoft Office macro scripting language. Macro viruses are possible in other scripting languages, such as VBScript, but the penetration of the Microsoft brand and antagonism towards Microsoft among virus creators means the vast majority of macro viruses only apply to Office. In this

Continued on page 84



"It was awesome.

I just stepped
out into
space.

No, really,

I DID it!

I musta been 100 feet up,
man, it was KILLER ..."

Melissa's 15 minutes of fame

Time to think back. What was the computer virus that came before Melissa? How about the name of the virus that followed Melissa?

If these two questions leave you scratching your head in vain, it's not because there haven't been any noteworthy viruses that predate or postdate Melissa. It's also not because those viruses pose less of a threat to computer users. In fact, Melissa is a relatively harmless virus that simply clogs email systems, but others like the new CIH viruses are far more sinister because they have the ability to destroy all of the data on your hard drive. It's simply that none of them — Happy99.Worm, Worm.ExploreZip or Win95.CIH — managed to excite the interest of the mainstream media in quite the same way.

Why did Melissa command so many more column inches and so much more air time? Some say it's all in the name. Put simply, Melissa makes great copy. Consider the way the virus was reported in the mass media:

- 'Bad girl's here'
Daily Telegraph, March 31, 1999;
- 'Melissa: A very bad girl',
the *Australian*, April 10, 1999;
- 'Melissa was fast. Melissa was sneaky. And boy, did Melissa ever get around'
Newsweek, the *Bulletin*, April 13, 1999.

Nathan Vass, chief of staff at the *Sunday Telegraph*, believes the virus' catchy name was instrumental in garnering widespread publicity. "If anything gets given a Christian name you get a play on words," he told *APC*. "If you call a virus ZT241 it's probably not going to make a lot of headlines."

Vass was keen to distinguish the tabloid approach to covering computer viruses from that of the broadsheets. He said that whereas the broadsheets have dedicated IT sections, the *Sunday Telegraph* does not report computer viruses as a matter of course.

"I don't know that average people care that much," confessed Vass. "It's a tough story to make all that sexy." Vass said tabloids tended to seek out the more "interesting or quirky angle" to make the issue more accessible to readers. "It shows what you have to do to get into the main section of the paper," he admitted.

But the nickname for one of the CIH viruses, Chernobyl, is also tabloid-friendly, so why was it not embraced to the same extent by news organisations?

Some media outlets attribute the inordinate attention given to Melissa to the ingenious work of PR companies. Network Ten chief of staff Andre Blunden is convinced this is the case. "A lot of it was generated internally by its own heat by well-placed PR people, people with clients in antivirus software," he said.

The manipulation Ten felt it was subjected to over Melissa has left the television station extremely wary of covering computer viruses. "We've done nothing since Melissa," said Blunden.



"We felt it was overdone, over-emphasised and as a result we're looking at anything in the future with a very sceptical eye."

Despite the disproportionate coverage Melissa received, computer viruses generally received far more attention by the mainstream press this year than ever before. New Zealand journalist David Armstrong attributes this sudden media fascination to the increasing adoption of technology.

"Computers are now vital to businesses and common in homes, so viruses . . . are a worry for more than just a nerdy minority group," he wrote in the *Christchurch Press* ('Saboteurs in Cyberspace', September 27, 1999). "The growth of Internet commerce and email is also adding to the problem. The more connected you are, the more vulnerable you become."

According to the Australian Bureau of Statistics, 40% of Australia's adult population (nearly 5.5 million) accessed the Internet in the 12 months to May this year. This represents a 50% increase on the same period last year. The Internet is fast becoming as ubiquitous as TV or radio.

So much so that mass-market women's magazine *Woman's Day* now runs a weekly 'Ms Megabyte' technology column. Author Yvonne Adele (pictured) said the purpose of her column is to educate readers about technology that has a lifestyle slant.

Adele believes the Melissa virus was the catalyst for the transformation of computer viruses into mass media fodder. "Viruses before were mainly in the realm of hardcore Internet users and geeks," she said. "Melissa made them much more accessible and widespread. Now viruses are available to anyone using Microsoft Word and email." The increasing number of Australians at risk of being exposed to computer viruses prompted Adele to devote a recent column to the subject ('Warning PC Plagues', September 27, 1999).

Vass pointed out media coverage of viruses is also influenced by the audience for whom the news is intended. Whereas some news organisations' gambit does not run to computer viruses on a regular basis, others such as ABC NewsRadio include a strong technology component in their overall news mix.

"We don't go out of our way [to cover computer viruses]," said NewsRadio network manager Ian Wolfe. "We simply cover computer viruses as part of our general news coverage. We have more science and technology reports than anyone else."

According to Wolfe, NewsRadio's target audience is "interested in the world around them" and he believes a higher proportion of the station's listeners are connected to the Internet than the general population. "They want to know everything about the Web and hear the latest in science and technology."

Ultimately it is media consumers that will determine the coverage assigned to computer viruses. All the news organisations *APC* spoke to agreed that any virus with the potential to affect a large number of people will be reported.
Cosima Marriner

"told ya!"



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Continued from page 80

sense, a macro is a set of instructions saved as part of a document which allows and uses parts of the Office suite to execute its functions. If Microsoft were to place too many restrictions on the use of scripting in Office, its product would be less useful, but the company has made it remarkably easy for virus authors to exploit the links between its applications. There are virus protection measures in Office apps, but modern macro viruses are capable of disabling this aspect when they run.

Microsoft Word macro viruses are the most common. The one that arrived at APC was W97M/Marker.A, which creates a VXD file in the root directory of the hard drive and attempts to find and infect all DOC files, then deletes its own VXD. The virus' only purpose is to replicate, which it does very efficiently. In this case it arrived via email with an invoice document from an external source, and our antivirus software picked it up immediately when the document was double-clicked, before it was loaded into Word.

The infamous Melissa is a macro virus that exploits the relationship between

Microsoft Word and the Outlook Express email client. Melissa emails itself to the first 50 people in Outlook's address book. These addresses may be mailing lists, which means it is possible for one user to transmit the virus to hundreds of others. If the minutes of the hour are the same number as the current day of the month, it will also insert a quote from *The Simpsons* into the current document. Apart from overwriting the first document in the user's current directory, Melissa doesn't have any destructive effects on the host computer — but the document it chooses to forward could be embarrassing for the sender, even beyond the mass spamming of friends and contacts. The big concern for system administrators is the potential volume of email generated by an infection.

Worms

A worm is a virus that is designed to spread over networks — the Internet being the primary example. Perhaps the most evil of the current crop is an email worm called Worm.ExploreZip.

Worm.ExploreZip exploits Microsoft's email programs, both Exchange and some

versions of Outlook. It grabs addresses from all messages currently in the user's inbox (those who are most likely to expect email from the infected PC) and sends a reply with the words, "I have received your email and I shall send you a reply ASAP. Till then take a look at the attached zipped docs." An attachment called ZIPPED_FILES.EXE is sent with the message. If the recipient runs the file, they will see a standard WinZip error message stating that the archive is not valid, but this is just a smokescreen. The virus quietly manipulates any WIN.INI files on all connected disks to load the virus on startup under the name _SETUP.EXE and creates a file called EXPLORE.EXE in the user's system directory. This is also run by WIN.INI on startup and proceeds to permanently delete all data files created by Microsoft Office applications on any disk to which the infected PC has write access (including network drives), while the virus continues to spread itself via email.

Unfortunately, Worm.ExploreZip hasn't received much media coverage — instead, a relatively harmless worm called Monopoly has been hyped (see 'Melissa's 15 minutes of fame', page 82). It uses the Outlook address book to send a message and picture

Virus myths

Many users have an irrational fear of binary viruses, often due to misinformation. For example, a virus cannot be transmitted simply by bringing an infected floppy disk near a computer — the disk actually has to be placed in a drive and accessed. A virus cannot spread from your PC to your VCR, dishwasher or other household equipment, even if that equipment uses embedded chips. Except in the case of macros embedded into data files, viruses cannot cross from one operating system to another. Although there are many parallels between the behaviour of binary viruses and biological ones, medical analogies should not be applied to the infection process on computers.

The mass media has recently been predicting that virus writers will take advantage of Y2K problems to cause havoc. A couple of new viruses have appeared purporting to be important Y2K updates for your system, tempting the user into running the attached file. But viruses that actually exploit the Y2K bug are pure media speculation.

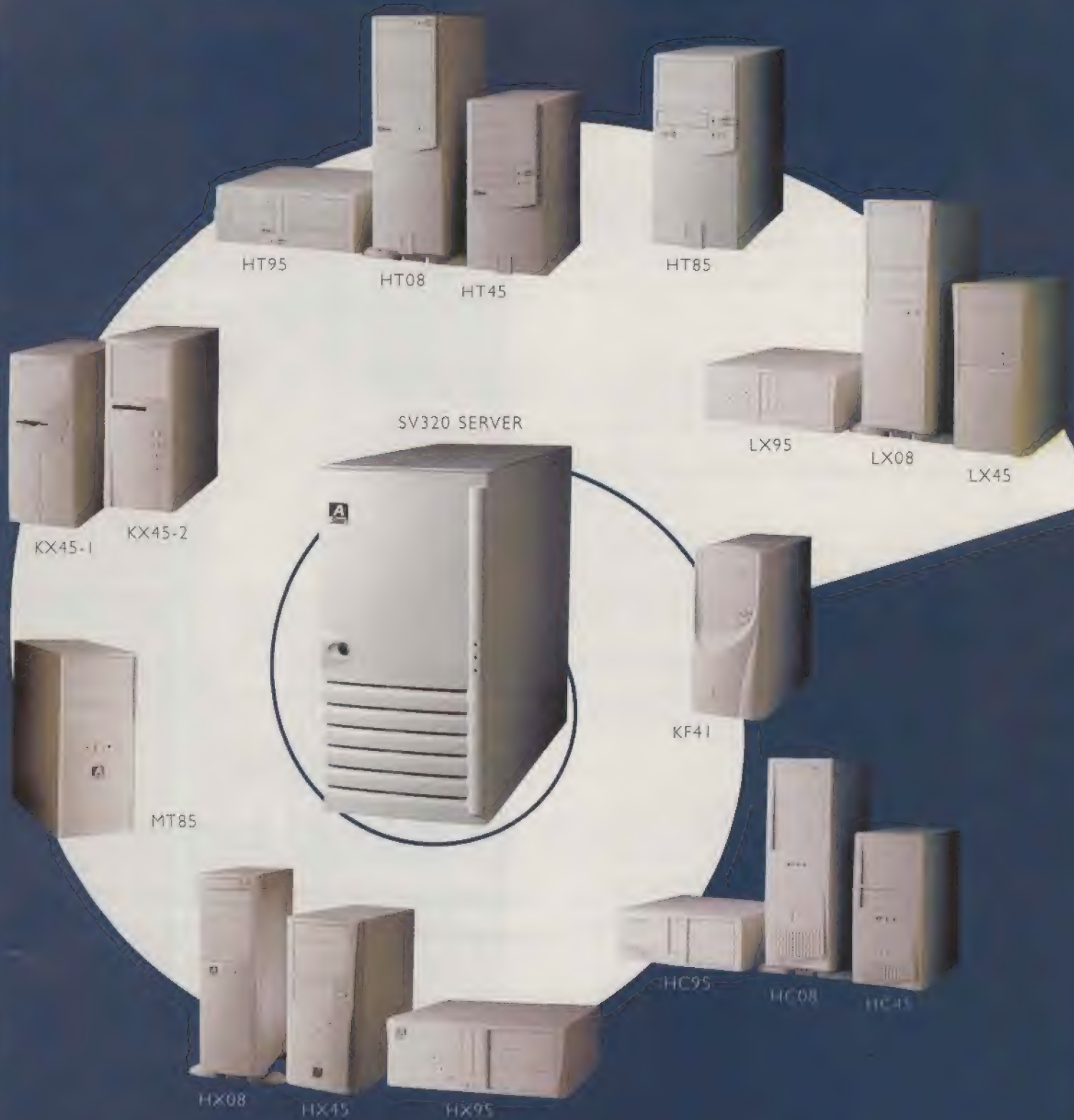
Irrational views of computer viruses also lead people to spread hoax virus warnings. Most of the virus warnings circulating on the Internet are fake and before forwarding any such email, it is well worth checking a Web page such as <http://www.symantec.com/avcenter/hoax.html>. Typical hoax tactics include warning you that reading an email with a certain phrase in the subject line will trigger a virus (which is impossible), or asking you to forward the message to everyone you know. If this warning were real, it wouldn't need to ask you to forward it. So, in the case of a hoax, the message acts like a virus and is spread because it convinces you to send it to everyone you know.

Some of the most common hoax warnings include subject lines such as Penpal Greetings, Good Times, Guts to say Jesus, Join the Crew, and even a warning that a Yellow Teletubby file will destroy your data. There are also several hoaxes in circulation regarding Y2K problems, stating either that Windows will fail on January 1, or warning of a 'Year 2000 Virus'.

The rule that simple email (text) cannot be a virus hasn't changed. Simply reading

an email will not infect your system. If an infected file is attached to the email, then your computer can be infected if you open or run the file, but this takes some carelessness on your part. Modern antivirus software can scan attachments either as they arrive or immediately before they are run and remove the offending virus before it causes any damage, so it is worth installing such a product.

"In a very, very weird and rare case it is possible that you can set up a desktop so that it will automatically execute the files that are on it, but that is certainly not the standard for 99.9% of the people using computers — and certainly not the people with lower levels of IT knowledge," said VET technical communicator Luke Hoban. "You can open the message, you can read the text. It's when you actually go to run the attachment that you need to be concerned. If [a warning says] you'll receive a message with a certain subject line and 'don't even open it or you'll lose your hard drive', well that's just not real. But it has the effect of lowering people's confidence in IT, and as such it does cause damage."



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accusing Bill Gates of being a monopolist. The only real threat is the potential volume of email generated across networks. The same goes for Happy99.Worm, otherwise known as the Ska worm, which displays a 'new year fireworks display' and copies itself to all outgoing email and newsgroup messages by modifying part of Windows' TCP/IP stack, WSOCK32.DLL (the user does not need to be using a Microsoft email or newsgroup client in order to trigger the worm).

Trojan horses

A Trojan horse is a program that appears to execute a legitimate or harmless function, while secretly executing another. Modern antivirus products are tasked with removing these, in addition to true viruses.

Back Orifice 2000 is probably the most famous Trojan of the 1990s. It is part of an alleged 'network administration tool', which functions most often as a hacking device. If the Back Orifice 2000 Trojan is installed on your Windows 98 or NT system, anyone with the Back Orifice 2000 client software has full access to everything on your computer across a network (such as the Internet). The Trojan does not spread by itself — someone has to deliberately email it to you, potentially disguised as a friendly file.

A Trojan named Polyglot also appeared this year, under the guise of a Y2K update that appears to have been emailed from Microsoft. The program monitors email, but unless someone continues to send it around the Internet it should become rare.

BIOS killers

A golden rule of computer viruses used to be that they could not damage hardware, but this has also changed. PCs now ship with a 'flash BIOS', which means that the ROM chip containing the basic operating instructions can be upgraded using software from the manufacturer. Inevitably, virus writers have figured out how to flash garbage into the BIOS, rendering a computer unbootable until the BIOS chip is replaced (most motherboard manufacturers will send out a free replacement chip).

The first of this new breed of virus, Win95.CIH, is easy to find on the Internet. It has been mimicked by virus writers with a vendetta, such as the author of the Kriz virus. This virus tries to flash the BIOS on Christmas Day and displays an anti-Christian message. There is currently no protection against CIH-style viruses other than that offered by recent virus scanners. Motherboard manufacturers could do more to help by password-protecting the BIOS or only allowing it to be flashed after physically adjusting a DIP switch. It is not yet possible to damage other pieces of hardware, though it is theoretically possible to exploit other flash upgrades (such as video card BIOS) or attempt to cause so much disk activity that a hard drive's lifespan might be reduced. ■

Resources

Details on computer viruses affecting Australia can be found at:

http://www.symantec.com.au/region/reg_ap/avcenter/
<http://www.vet.com.au/html/vvcc/anti-virus/zoo/>

More technical information is available from Virus Bulletin, at <http://www.virusbtn.com/>.

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PC SCORCHERS

The lead-up to Christmas is probably one of the better times of the year to buy a PC, as vendors eager for the Christmas dollar are sure to be offering bargains and discounts of one kind or another. Let's face it, this is the time to buy. Whether you want a PC for the company, the home office or for gaming, these reviews cover the lot.

This year APC looked at PCs in three categories. For the budget conscious APC requested PCs that cost below \$1,500. In the mid-range — not quite budget but not too expensive — a price ceiling of \$3,000 was set. Then there's the Ultimate category, where no limits were set on price or specifications. This last category is for the dreamers and for those who want it all, at any price.

The difference a year makes

In the past year, the PC market has done what it's always done from year to year: prices dropped, minimum specifications improved and PCs got faster. In this time, the innovatively named Intel Pentium III was released on the market, as was the equally imaginatively titled AMD K6-3. There was nothing incredibly new about either product line; both took another step in the processor's inexorable crawl towards greater and greater speed. The long-struggling Cyrix dropped out of the PC processor market altogether.

The most innovative processor to emerge

this year was the AMD Athlon. AMD's Athlon was more of an advancement in performance over its previous chips than the Intel Pentium III was over the Pentium II. In fact, the Athlon is proving to be a Pentium III beater. It finally brought some competition into the market, forcing Intel to drastically reduce prices in a bid to retain its market share. In this review, one quarter of the systems feature AMD processors. This year has seen a dramatic increase in the number of processor releases from both vendors, not just in clock speeds but also buses. This increase is not necessarily a good thing, as the PC you buy now is obsolete within about six weeks.

A more pressing issue, particularly in recent months, has been the wildly fluctuating price of SDRAM, which has been brought to the fore by the Taiwan earthquake in September.

In 1999, 'PC integration' ceased to be a dirty word. Intel, having made major

blunders in the budget PC arena in the past — notably, concentrating on faster processors and totally missing the sub-\$US1,000 US market when it arose — has finally come to the budget rescue with the i810 chipset. With integrated audio and video, the 810-based motherboards have proven very popular with the manufacturers of budget systems. The audio may not be the best, but the video is capable and because they no longer require a graphics card or soundcard, the overall cost of the systems to consumers has fallen accordingly.

This past year has also seen the advent of the cheapest systems available — the 'free PC'. Like mobile phones, some vendors will sell you a PC with no upfront cost, provided you sign a contract with their approved ISP.

Finally, manufacturers have come to the realisation that beige boxes are boring. We have Apple's iMac success to thank for driving this point home. Of the 24 machines submitted for this review, five have attempted to break the bonds of the beige prison. Let's hope this is one trend that continues in the new year.

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PCs under \$1,500

Last year, APC's budget category carried a price cap of \$2,000. This year the figure has dropped by \$500 and we still received some very good systems. Most of the vendors' prices come just below or on this price point, but Gateway was well below it. Our minimum specifications for this category were very simple: not only should the PC cost less than \$1,500, but it should also have Windows 98 installed and feature a minimum 64M of RAM. Last year the criteria were more lenient, allowing a minimum of 32M of RAM (although less than half of the systems submitted at the time came with such low specs.)

Last Christmas, you could net yourself a system with a 350MHz Pentium II or 300MHz K6-2 processor and 64M of RAM, which were not the most powerful machines by a long shot, but very good all the same. This year, our minimum machines boast more grunt and power than last year's Ultimate category. One thing that hasn't changed is the tiny monitors; for budget systems, 15in screens are the norm. Another trend to emerge this year is the 40x CD-ROM drive which comes standard with every system. The exception is the Adelong machine, which comes with a 6x DVD drive.

Half of the budget systems feature motherboards based on the Intel i810 chipset, and rely on this for both audio and video. Benchmark results placed the i810's graphics performance higher than some systems which relied on separate video cards, but this was not always the case. One thing APC looked at was whether the vendor had saved on supplying a separate video and soundcard, and if so, what had been included in the system to make up the price. Some vendors included a faster processor, a modem or good speakers, but others included no extras.

Adelong Everex Explora 450MHz

When APC sets a tight price limit for a PC review, it's always interesting to see how the vendors juggle the components to build the best system for the price. Most of the vendors used Intel Celeron processors and relied on the built-in graphics and sound processors on the motherboard of the Intel 810 chipset. Along with the THX Discovery, the Adelong Everex Explora 450 used a 450MHz AMD K6-2 processor, which is cheaper than the 500MHz Celeron that most of the other vendors used.

Adelong has used the price difference to add in some extras such as a DVD-ROM drive and a large (though not entirely useful) collection of software. The 6.4G hard disk drive and 64M of memory were standard among systems in this category. Adelong skimped on a few basic components such as the monitor, which was unimpressive, and the speakers, which weren't included at all.

Several vendors in this review have tried to emulate Apple's PC-as-an-

appliance look. In Adelong's case, this means adding a shiny purple bit and a translucent orange thing (which looks like a power button but isn't) to the front of the PC.

The Explora 450 performed well in the Ziff-Davis Business and High-End Disk Winmark tests, and its 2D graphics performance was average. However, it performed badly in all the other tests, which indicates a rather underpowered system.

Overall, Adelong's balance of components and poor performance add up to a system that fails to provide good value.

Josh Mehlman

Distributor	Adelong
Phone	(02) 8344 3190
Online	http://www.adelong.com.au/
Price	\$1,495
In short	Underpowered and a poor choice of components.



Graphically, the Alpha was strong in the Half-Life timedemo and Ziff-Davis Business Winstone 99 tests, but dropped away with both the Business and High-End Graphics WinMarks. The hard drive scored number one in every test by a very substantial margin.

Of course, there are swings and roundabouts with PC specs.

Although you win with the graphics and hard drive power, you lose out

in sound quality. The Alpha Celeron 500 sports an older ISA soundcard, which is quite capable but behind the times. The tiny multimedia speakers are adequate for their purpose, but don't throw out your hi-fi just yet.

The monitor is the ubiquitous 15in affair, and was incapable of handling a refresh rate greater than 75Hz. All of our tests had to therefore be run at this lower refresh rate. At this speed the desktop is aesthetically dull, but for the corporate world where a dull desktop is a bonus, the Alpha Celeron 500 should easily find a niche.

Darren Ellis

Distributor	Alpha Computers
Phone	(03) 9415 9177
Online	http://www.alpha.computer.com.au/
Price	\$1,499
In short	Enough excitement for the home enthusiast on a budget, but also great for the business sector.

Alpha Computers Celeron 500

Out of the two sub-\$1,500 machines to have a Celeron 500MHz processor and 64M of SDRAM (the other is the Pioneer Value C500), this Alpha machine does not follow the 'Intel's 810 integrated chipset is great' model of PC design. If it did, it may have cost less, but it still manages to pack a decent video card and hard drive into its beige box and remain below the \$1,500 price point.



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Beyond Computers SuperO C Class

Intel's i810 chipset is a boon for cheap PCs, as it means either a lower price or better extras. The SuperO C Class has neither unfortunately, but this is not to say that it should be dismissed completely. The integrated graphics card netted it second place in the Ziff-Davis Business and High-End Graphics WinMark tests and it was equal first with the Alpha Celeron 500 for the Business



Winstone 99 test—no mean feat when one-third of the low-end systems were unable to even run it.

In the Viewperf tests, it rated highly (third position) and was only a few frames per second (fps) behind the leader in our Half-Life timedemo test. The same can be said for the 3DMark 99 results. The hard drive was not the fastest in our tests, but still speedy enough to cope with most heavy use. The CPUMark 99 and FPU WinMark 99 results were not far behind the two faster Celeron-equipped machines and higher than the two 450MHz K6-2 systems.

The 15in LG monitor is good looking and easy to use. The bundled speakers are not the greatest we've seen or heard, but are able to pass muster. All up, these results indicate a great system for gamers or home enthusiasts, but it's also well suited for the corporate market.

Darren Ellis

Distributor	Beyond Computer
Phone	(02) 9648 0888
Online	http://www.beyondcomputers.com.au/
Price	\$1,499
In short	Not a bad system; fairly bland on the outside but better under the hood.

Gateway Neo

Through some twist of fate, the Gateway Neo ended up sitting next to the Apple iMac in APC Labs, which allowed us to see how

derivative Gateway's design is. The Neo even has a handle on the top, but unlike the iMac, the Neo is so heavy you couldn't possibly lift it with the handle. Where Apple's design is sleek and elegant, Gateway's is rather bulky and cumbersome. Neo's built-in 15in monitor is pleasant to look at, but the integrated speakers sound a little tinny and lack bass power.

Gateway's all-in-one Neo is targeted at the same novice consumers as the Apple iMac. Neo requires very little effort to set up; just plug in the power, keyboard, mouse and phone line, and you're away. Gateway has added several features to make the operating system a little easier to use. The desktop has shortcuts to help you set up a connection to Gateway's Internet service, and to a user-friendly help system that guides you through the basics of using the computer.

Once you buy a Neo, you're stuck with it; you can't even upgrade the memory from 64M or swap the CD-ROM drive for a DVD drive. The specifications are rather basic, and the 4.3G hard disk drive is perhaps a little small by current standards. On the other hand, \$1,299 is not a lot to pay for an entire system.



Given it has the slowest processor in this category (a 400MHz Celeron) its mediocre performance was hardly surprising, although it came out ahead of the AMD-based Adelong and THX systems in the 3D graphics tests. It would perform adequately as a home system for word processing, email and Web surfing, but it's not the best choice for multimedia and games. The retail version has a slightly different finish to the system pictured above.

Josh Mehlman

Distributor	Gateway
Phone	1800 500 742

Online
Price
In short

<http://www.gw2k.com.au/>
\$1,299
Inexpensive all-in-one for the home.

Pioneer Value C500

You can't really get more down-to-earth or no-frills than this system. Aside from the speedy Celeron processor, it goes for the bare minimum specifications. Of the two sub-\$1,500 systems that feature a 500MHz Celeron processor, the Pioneer Value C500 was the speedier performer. Relying on the i810 chipset to deliver both sound and graphics, the system scored rather well in our tests.



It was tops in the Ziff-Davis Business and High-End Graphics WinMark tests, closely followed by the Beyond machine, which also used the Intel i752 graphics chip. It achieved good frame rates in Half-Life timedemo and a high score in 3DMark 99. The system topped the CPUMark 99 and FPU WinMark 99 tests, edging out the Beyond system by the tiniest margin. Its hard drive fared better in the Business Disk WinMark 99, ranking second, but last under the High-End test by a large margin. This with the 15in Mitsubishi monitor, which we liked, makes a good visual combination. The sound is bit of a let-down, however—the speakers are primitive.

Because the Pioneer Value C500's primary focus is squeezing the best performance out of its constituent parts, the aesthetics and ease of use have been neglected. The keyboard and mouse, the two input devices you'll use the most, are uncomfortable to use.

Darren Ellis

Distributor	Pioneer
Phone	(02) 9260 2888
Online	http://www.pioneercomputers.com.au/
Price	\$1,499
In short	Not much to look at, but good performance.

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THX Discovery

Like Adelong, THX opted for a cheaper 450MHz AMD K6-2 processor rather than a more expensive 500MHz Intel Celeron. This allowed THX to spend a little more on some of the other components such as the graphics card, soundcard and speakers. The rest of the configuration — 64M of memory, 6.4G hard disk drive and 15in monitor — is standard for this category.

THX's trade-off didn't work well, owing to the relatively poor performance of the K6-2 processor. AMD's K6-2 is renowned for its poor floating-point performance, which helps to explain why the THX Discovery was down at the bottom of the 3D graphics pile, along with the other AMD-based system. The THX performed very poorly in the Viewperf tests, which measures 3D performance under OpenGL. The Matrox



Millennium G200 is renowned for being particularly bad under OpenGL.

Aside from an average score in the Ziff-Davis High-End Disk WinMark test, the THX scored very poorly in all the tests, coming close to the bottom in the processor, disk and 2D graphics tests. We were not able to run the Business Winstone test on this PC, but chances are it wouldn't have been good news either.

THX included some rather nifty features. Similar to much more expensive systems like the IBM Aptiva GOA, the THX's keyboard has a full range of CD player and audio control buttons, as well as a few programmable buttons for launching your favourite applications.

Josh Mehlman

Distributor	THX
Phone	(02) 9262 1588
Online	N/A
Price	\$1,495
In short	Poor performer.

Editor's Choice



Alpha Celeron 500

Highly commended Beyond Computers SuperO C Class

Neither of these systems are the best looking units available, but the no-frills aesthetics hide some good performance. Although the Alpha Celeron 500 was not the most robust of PCs when it comes to 2D graphics, it aced the Half-Life timedemo, was tops for most of the Viewperf tests and came first for the Business Winstone 99 benchmark and both of the hard drive tests.

The Beyond PC is one of the few Intel i810 based machines to have some good extra components included for the price. Both of these systems are great for gamers, but are equally suited to the business desktop as well. They both offer something for everyone at an affordable price.

How we tested

To test the performance of the computers submitted for review, APC Labs used a mixture of the Ziff-Davis suite of benchmark software, Futuremark's 3DMark 99 Max, plus SPEC's Viewperf and Half-Life's timedemo.

Winstone 99 runs a suite of modern business and graphics applications. These applications are timed to measure the length of time the system takes to complete these tasks. The Business Winstone result is a comparative score of how fast the computer could complete the various business applications.

WinBench 99 contains a set of sub-tests, each designed to find out how fast each component of a PC really is.

Business and High-End Graphics
WinMark 99 measure the system's graphics performance when performing video tasks associated with common business applications, as well as demanding multimedia and 3D applications.

Business and High-End Disk
WinMark 99 provides a measure of how a system's hard disk subsystem handles a load equivalent to that demanded by the business applications used in the Business Winstone 99 test.

CPUmark 99 compares the speeds of the processor, memory and cache subsystems.

FPU WinMark 99 is a 32-bit floating-point processor test.

3DMark 99 Max tests 3D acceleration in a 'real world' environment. These tests are designed to ape the conditions posed by games and applications.

In the same way that Graphics WinBench profiles the GDI calls made by the applications, SPEC's **Viewperf** profiles OpenGL calls made by a set of workstation applications to test the 3D graphics capabilities of a system. It extracts the OpenGL instructions delivered by applications during the run of a script, and repeats those instructions without any other application overhead.

Its standard run consists of five applications (Viewsets). These are: Advanced Visualiser (AWadv5-03), DesignReview (DRV-06), Data Explorer (DX-05), Lightscape (Light-03) and ProCDRS-02. The results are a weighted frame rate achieved in each viewset.

Viewperf, it should be noted, is more a test of the geometry capabilities of a system than a rendering test — unlike current games, which focus on rendering and don't

have high geometry demands. In most circumstances, it is a better test of the system processor than of the graphics card, unless, like the GeForce 256, the graphics card has a geometry engine on board.

Our final test involved running a timedemo in Half-Life, a 3D game from Sierra. This demo was run at 800 by 600dpi (if the card was capable) with the appropriate rendering driver; either the 3dfx mini driver in OpenGL, the card's own OpenGL driver or Direct3D. This tested the card's frames per second (fps) running the game full screen.

All the systems tested were shipping versions available to the general public at the time of publication, unless otherwise stated. Please note that because of the lead time between testing the machines and publication, some specifications and pricing may have changed. Be sure to check this information with the vendor before purchase.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representation or warranties as to the results. WinBench is a registered trademark of the Ziff-Davis Publishing Company.

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SPECIFICATIONS: PCs UNDER \$1,500

Product	Everex Explora 450	Celeron 500	SuperO C Class
Distributor	Adelong	Alpha Computers	Beyond Computers
Phone	(02) 8344 3190	(03) 9415 9177	(02) 9648 0888
Online	http://www.adelong.com.au/	http://www.alphacomputer.com.au/	http://beyondcomputers.com.au/
Price	\$1,495	\$1,499	\$1,499
Processor	AMD K6-2 450MHz	Intel Celeron 500MHz	Intel Celeron 466MHz
Secondary cache	512K	128K	128K
Tested/maximum RAM and type	64M SDRAM (512M max)	64M SDRAM (768M max)	64M SDRAM (512M max)
Hard disk	6.4G Maxtor	6.4G Quantum	6.4G Quantum Fireball CX
Hard disk controller	Via Bus Master PCI IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82801AA Bus Master IDE
Hard disk file system	FAT32	FAT32	FAT32
Graphics card	Trident CyberBlade	nVidia Vanta 128	Intel 810 chipset
Video bus type	AGP	AGP	AGP
Video RAM	8M SGRAM	8M SGRAM	4M plus system RAM
Video controller chip	Trident	nVidia TNT2 Vanta	Intel 810 chipset
Graphics driver name and version	4.11.01.2182	4.11.01.0109	4.11.01.1272
Monitor	15in Videocom	15in Philips	15in LG
Tested resolution/colour depth/refresh rate	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/75Hz	1,024 by 768/16-bit/85Hz
CD-ROM/DVD drive	6x DVD	40x CD-ROM	40x CD-ROM
Soundcard	Integrated PCI card	Sound Blaster Vibra 128 PCI	Intel 810 chipset
Speakers	N/A	120W CDSONIC	480W hi-fi speakers
Modem	56K internal	N/A	N/A
OS available	Windows 98	Windows 95/98/NT, Linux, OS/2	Windows 98
Warranty	2 years RTB	2 years RTB parts and labour	3 years limited
Bundled software and accessories	Lotus SmartSuite, Notes 5 Client, IBM Perfect Photo, Norton AntiVirus, WinFax Pro, PowerDVD	N/A	N/A

Product	Neo	Value C500	Discovery
Distributor	Gateway	Pioneer	THX Computer Systems
Phone	1800 500 742	(02) 9690 2888	(02) 9262 1588
Online	http://www.gw2k.com.au/	http://www.pioneercomputers.com.au/	N/A
Price	\$1,299	\$1,499	\$1,495
Processor	Intel Celeron 400MHz	Intel Celeron 500MHz	AMD K6-2 450MHz
Secondary cache	128K	128K	512K
Tested/maximum RAM and type	64M SDRAM (one memory slot, not user serviceable)	64M SDRAM (512M max)	64M SDRAM (768M max)
Hard disk	4.3G Quantum Ultra ATA	6.4G Quantum Fireball	6.4G Quantum Fireball CX
Hard disk controller	Intel 82801AA Bus Master IDE	Intel 82801AA Bus Master IDE	Ali M5229 PCI Bus Master IDE
Hard disk file system	FAT32	FAT32	FAT32
Graphics card	Intel 810 chipset	Intel 810 chipset	Matrox Millennium G200
Video bus type	AGP	AGP	AGP
Video RAM	4M plus system RAM	4M plus system RAM	8M SDRAM
Video controller chip	Intel 810 chipset	Intel 810 chipset	Matrox Millennium G200
Graphics driver name and version	4.11.01.1321	4.11.01.1161 Ver PV1.0	4.11.01.4330
Monitor	15in Philips	15in Mitsubishi	15in Mitsubishi
Tested resolution/colour depth/refresh rate	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz
CD-ROM/DVD drive	40x CD-ROM	40x CD-ROM	40x CD-ROM
Soundcard	Intel 810 chipset	Intel 810 chipset	Sound Blaster 128 PCI
Speakers	Integrated speakers	120W speakers	GS-280 300W speakers
Modem	56K integrated on 810 chipset	N/A	56K internal
OS available	Windows 98	Windows 98	Windows 98
Warranty	1 year RTB parts and labour	2 years parts, 5 years labour	1 year RTB
Bundled software and accessories	MS Works Suite 99	N/A	Lotus SmartSuite, World Book Encyclopaedia

Note: Information contained in these reviews is based on products and specifications supplied to APC by distributors at the time of writing. Readers should check current pricing and specifications with distributors.

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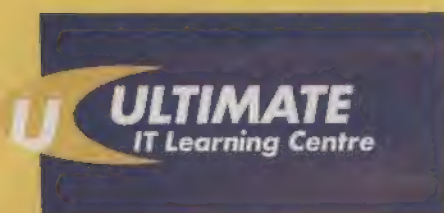
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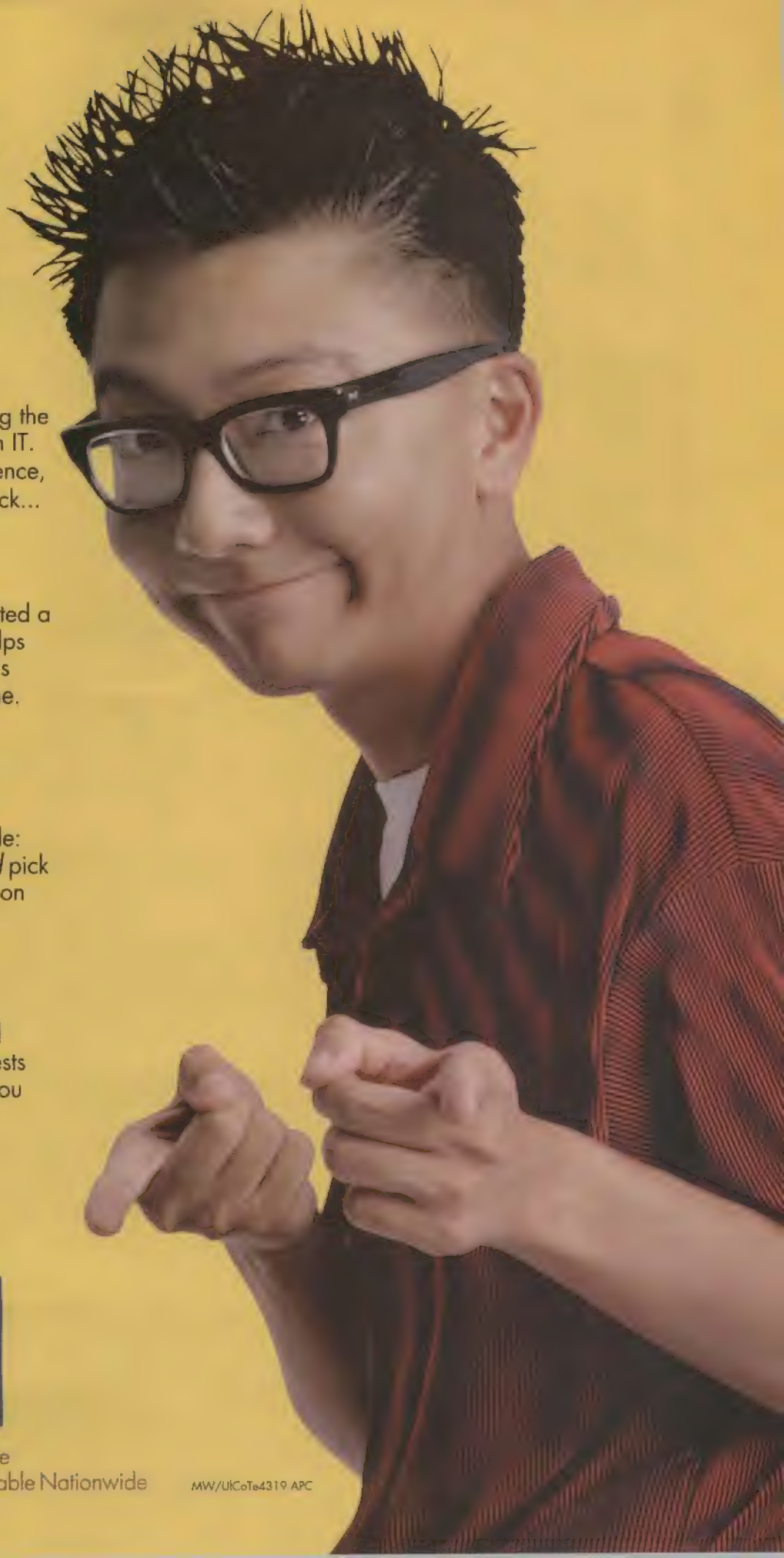
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Test results: PCs under \$1,500

Product Business Winstone 99

Alpha Celeron 500		21.1
Beyond SuperO C Class		21.1
Pioneer Value C500		20.1
Gateway Neo		16.2
Adelong Everex Explora 450	Unable to run	
THX Discovery	Unable to run	

Product High-End Disk WinMark

Alpha Celeron 500		11,000
Adelong Everex Explora 450		8,160
Gateway Neo		7,740
THX Discovery		7,530
Beyond SuperO C Class		7,430
Pioneer Value C500		7,220

Product Viewperf Advanced Visualiser

Pioneer Value C500		11.15
Beyond SuperO C Class		10.5
Alpha Celeron 500		10.49
Gateway Neo		8.86
Adelong Everex Explora 450		4.53
THX Discovery		1.96

Product CPUmark99

Pioneer Value C500		35.8
Alpha Celeron 500		34.7
Beyond SuperO C Class		33.9
Gateway Neo		29.2
Adelong Everex Explora 450		23.5
THX Discovery		20.8

Product Business Disk WinMark

Alpha Celeron 500		3,230
Pioneer Value C500		2,800
Adelong Everex Explora 450		2,510
Beyond SuperO C Class		2,470
THX Discovery		2,470
Gateway Neo		2,110

Product Viewperf Data Explorer

Alpha Celeron 500		9.72
Pioneer Value C500		5.06
Beyond SuperO C Class		4.75
Gateway Neo		4.09
Adelong Everex Explora 450		2.24
THX Discovery		1.73

Product 3DMark 99 MAX

Alpha Celeron 500		3,427
Pioneer Value C500		2,803
Beyond SuperO C Class		2,761
Gateway Neo		2,246
THX Discovery		1,400
Adelong Everex Explora 450		857

Product Business Graphics WinMark

Pioneer Value C500		144
Beyond Super O C Class		139
Adelong Everex Explora 450		115
Gateway Neo		98.8
THX Discovery		98.2
Alpha Celeron 500		79.7

Product Viewperf Lightscape

Alpha Celeron 500		1.18
Pioneer Value C500		1.06
Beyond Super O C Class		1
Gateway Neo		0.86
Adelong Everex Explora 450		0.36
THX Discovery		0.28

Product FPU WinMark 99

Pioneer Value C500		2,680
Alpha Celeron 500		2,650
Beyond SuperO C Class		2,500
Gateway Neo		2,110
Adelong Everex Explora 450		1,490
THX Discovery		1,420

Product High-End Graphics WinMark

Pioneer Value C500		413
Beyond SuperO C Class		385
Alpha Celeron 500		378
Adelong Everex Explora 450		376
THX Discovery		355
Gateway Neo		334

Product Viewperf DesignReview

Alpha Celeron 500		5.91
Pioneer Value C500		5.57
Beyond SuperO C Class		5.26
Gateway Neo		4.53
Adelong Everex Explora 450		2.06
THX Discovery		0

Product Half-Life timedemo

Alpha Celeron 500		26
Pioneer Value C500		24
Beyond SuperO C Class		23.3
Gateway Neo		18
THX Discovery		13.8
Adelong Everex Explora 450		11.1

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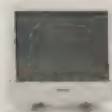
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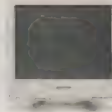
E100 - 15"



E200 - 17"



G400 - 19"



G500 - 21"



PCs under \$3,000

It's a little hard to compare many of these systems with those in last year's review as APC only used two categories in 1998. However, some of the Ultimate systems were about the \$3,000 to \$3,500 price point and should make for a general comparison. Again, our specifications for this category were not the most stringent — all that was needed was a system with Windows 98, a CD-ROM and a price of between \$1,500 and \$3,000.

We received less of a cross-section of machines for this category than the budget bunch — most were Intel-based systems, except for the Adelong Athlon machine and, obviously, the Apple

iMac. It is interesting to note that three of the machines came with 64M of RAM and not the 128M featured by the rest, which is becoming the new industry standard.

Half of the machines had DVD drives installed. Most telling is the fact that *none* of the systems with DVD drives, in all three categories, came with hardware DVD decoder cards. All rely on soft-DVD decoders of one form or another. The reason for this is simple: a DVD decoder card adds a hundred dollars or more onto the cost of a system without giving any speed benefits. The downside to this cost saving is that not all of the machines were capable of running

soft-DVD smoothly in full-screen mode. Buyers beware.

Datawell was the only vendor last year to submit a system at the \$3,000 price point. That machine came with a Pentium II 400MHz processor, 64M of SDRAM, a 4.5G hard drive, an Intel i752 graphics card and a 15in monitor. This year, you're looking at a lot more bang for your buck. The processor clock speeds have increased (aside from the iMac's 400MHz G3), the RAM has either doubled or quadrupled, the hard drives are up to three times larger, and only four of the systems have 15in monitors. Next year should hopefully see a similar increase in specs.

Adelong Athlon PC 550MHz

As the only system under \$3,000 without an Intel processor, the Adelong Athlon PC 550MHz system is a perfect example of why Intel has been concerned about AMD's re-emergence on the market as a serious contender. It's also one of three machines in this category to have only 64M of RAM.

It features a Matrox Millennium G400 Max card, which when tested by APC (see APC August 1999, page 124) was a clear winner. Here it also topped the Ziff-Davis Business Graphics WinMark 99 and the High-End Graphics WinMark 99 tests. Its score was average, but achieved more than enough of a frame rate in Half-Life to satiate the pickiest of gamers.

The Athlon chip held its own against the faster Pentium III machines, winning by a clear margin in the CPUmark 99 and not far behind the 600MHz Pentium III systems (both with double the RAM) in the FPU WinMark 99 test. The hard drive was not quite up there with the faster drives, but at 13G you can't really complain.

This is a great machine for the gamer or home enthusiast. The Diamond Monster MX300 soundcard and Altec Lansing speakers offer superb audio. The

DVD drive is good value for money, unlike the software player. When we ran a DVD movie full screen, it was slightly (and only slightly) jerky. For the extra money, pop in a hardware DVD decoder card and round off what is a great system.

Darren Ellis

Distributor	Adelong
Phone	(02) 8344 3190
Online	http://www.adelong.com.au/
Price	\$2,945
In short	Good specs, good results, good system.



nVidia Riva TNT2 graphics card with 32M of VRAM, which is the middle of the TNT2 range. This combination worked very well; the Alpha scored very highly in all the graphics tests. It grabbed second place in both Business and High-End Graphics WinMark, came second in 3DMark 99 and placed first in two of the four Viewperf tests.

Alpha chose a rather poor combination of soundcard and speakers, so the audio quality wasn't the best. Alpha also included a CD-ROM drive, when a DVD drive might have been more appropriate.

Josh Mehlman

Distributor	Alpha Computer
Phone	(03) 9415 9177
Online	http://www.alphacomputer.com.au/
Price	\$2,999
In short	It goes, it goes, it goes, it just goes.

Apple iMac DV Special Edition

The success of the iMac in the past year has put Apple back on the map and made

Alpha Computer PIII-550

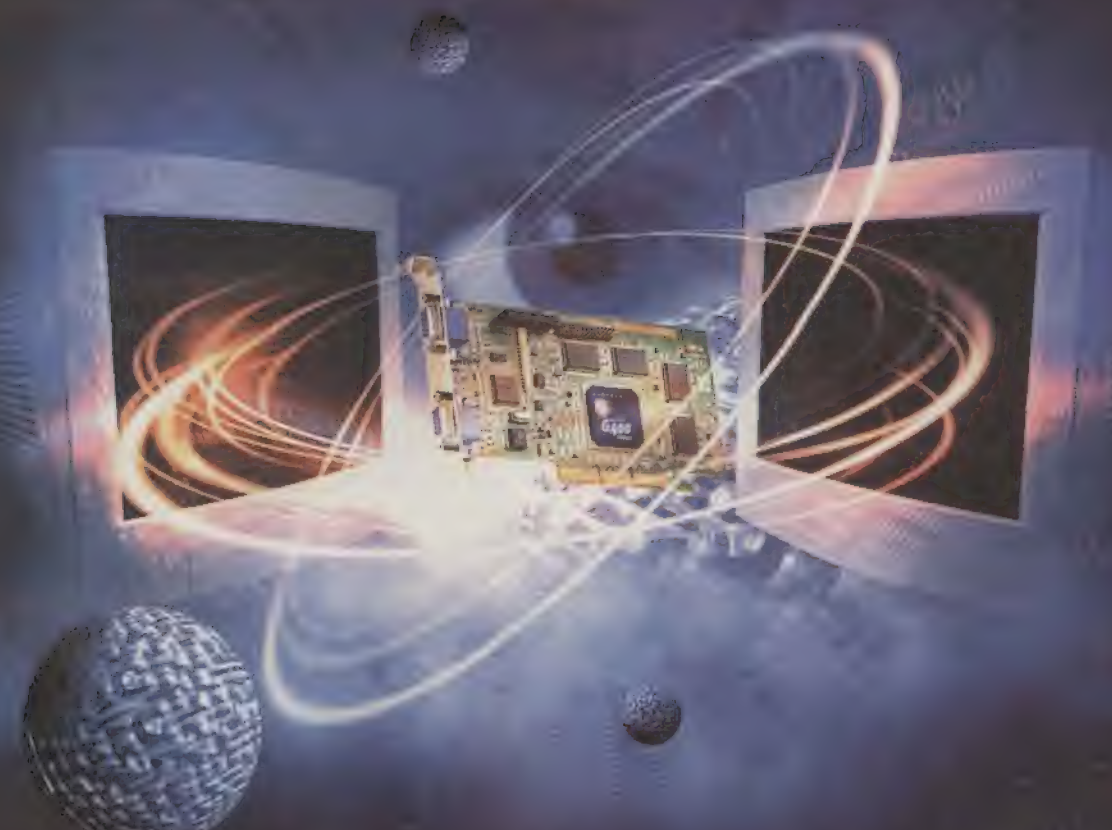
Alpha's PIII-550 has a distinct no-frills feel to it. By putting its eggs in the performance basket Alpha neglected some of the less tangible, more experiential aspects of the system, such as audio.

Alpha splurged on storage, installing a large and relatively expensive 18G Ultra ATA/66 IBM hard disk drive. Not only was this the largest hard disk drive in the sub-\$3,000 category by far, it was also clearly the strongest performer, blitzing the competition in the Ziff-Davis Business and High-End Disk WinMark tests. Not surprisingly, this led to a top score in Business Winstone 99, which relies heavily on disk performance.

Alpha chose a reasonably speedy 550MHz Pentium III processor, although two systems in this category managed a top-of-the-range 600MHz Pentium III. Alpha backed this up with 128M of memory, as did most vendors here.

For graphics grunt, Alpha selected an





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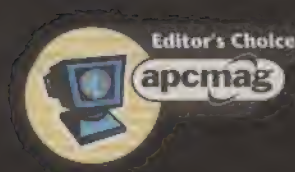
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the world rethink PCs. Apple has followed up the original iMac with three new models.



We looked at the top model, the iMac DV Special Edition. Both the DV and DV Special Edition models have a 400MHz PowerPC G3 processor and a trayless DVD-ROM drive. The Special Edition model also has 128M of memory rather than 64M, and a larger hard disk drive.

Apple tweaked the physical look and feel of the iMac, removing a lot of the chassis surrounding the monitor, so you can now see right inside the system. The panel on the side which covered all the connectors has been removed, so now all your peripherals plug straight into the side of the system.

In terms of specifications, the iMac compares favourably to the other PCs in this feature. Its memory and hard disk are on par with the higher-end systems we reviewed. Don't be fooled by the clock speed either. Since it's an entirely different processor and operating system, you can't compare performance strictly by clock speed. Unfortunately, there isn't any easy way to compare Macs and PCs head to head. Apple's hysterical benchmark claims aside, we think the iMac will perform as well as almost all the systems in this category. The only area it falls down in is graphics — APC's previous tests have shown the ATI Rage 128 to be inferior to the TNT2 and Voodoo3 chips that most of the systems in this category have.

Josh Mehlman

Distributor	Apple
Phone	13 36 22
Online	http://www.apple.com.au/
Price	\$2,999
In short	Fantastic design, and a competitive performer.

Beyond Computers SuperO P Class

This machine features the 600MHz Pentium III chip — the fastest available at the time of review. Only one other system in this category, the Pioneer 2000 SOHO Pentium III, had this chip. The Pioneer edged it out on the Ziff-Davis CPUmark 99 test (both were behind the slower 550MHz Athlon system from Adelong) but it came first in the FPU WinMark 99 test. Both machines also scored highly in the Business Winstone 99 test.

You can't really fault the hard drive or graphics subsystems on this machine. Although its hard drive results are far from perfect, it's nonetheless robust and speedy. The graphics are excellent — the results from the WinFast S320 TNT2 Ultra card were high for the Ziff-Davis tests, at the top end of the 3DMark 99 tests and the same for the Half-Life frame rate tests. It rated very highly with Viewperf, which is a bonus for OpenGL gamers.



This system has some great components, but not the requisite output devices. The two most glaring examples of this are the graphics and audio. It's a pity the speakers are inferior — the Diamond Monster Sound MX300 soundcard deserves so much more. It's also a shame about the 15in monitor; 70% of vendors in this category favoured either 17 or 19in models.

Darren Ellis

Distributor	Beyond Computers
Phone	(02) 9648 0888
Online	http://www.beyondcomputers.com.au/
Price	\$2,999
In short	This is a great machine for the hardcore gamer, let down by some components.

BlueFire ChromeStation 500T

Overpriced systems are something we're used to from big-name vendors. But when a small vendor like BlueFire sends us an overpriced system for review, we have to wonder what it was thinking.

BlueFire's ChromeStation 500T looks reasonable to begin with. It has a 500MHz Intel Pentium III processor and 128M of memory. The 500MHz processor isn't the fastest in this category, but it isn't the slowest either, and the majority of the systems under \$3,000 have 128M of RAM. The 8.4G hard disk drive is probably enough for most purposes, but is on the smaller end of the scale for this category.



So far, so good, until BlueFire chose to use the Intel 810 chipset's integrated graphics and sound processors rather than include separate graphics and soundcards.

This is a solution more frequently seen in budget systems because its performance in graphics is reasonable but far from exciting. BlueFire also sided with the 50% of vendors that included a CD-ROM drive rather than a DVD drive.

What this adds up to is a system that is left behind in the performance stakes with almost no redeeming features. The ChromeStation lingered near the bottom of the performance tests with very few exceptions, and appeared to be most comfortable in third-last position.

BlueFire included a few nice extras, such as Labtec speakers, that sound almost as good as the Altec Lansing and Boston Acoustics speakers that came with the Dell and Gateway systems respectively. However, this did not justify the poor performance and minimalist specs.

Josh Mehlman

Distributor	BlueFire
Phone	(02) 9439 4394
Online	http://www.bluefire.com.au/
Price	\$2,999
In short	Overpriced or underfeatured, but either way not worth it.



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3M Innovation

ComfortView Professional

APC was divided over the casing of this system. The sleek, rounded plastic door that hides all the switches, lights and drives away was seen as either ridiculous looking or a fashionable idea. But when did looking silly ever stop a PC vendor? Looked at an iMac lately? The final consensus was that although it doesn't fit on the desktop, it would blend in well with the hi-fi, VCR and TV if you are going to use the system as a home machine.

At first glance on the results tables (page 112) it languishes near the bottom of every test. Then again, it also has a



mere 64M of RAM and a Pentium III 450MHz processor (equal slowest with the IBM Aptiva GOA), so the results aren't as disparaging as they seem. All in all, the test results reflect what you'd expect from a system with this configuration.

The 19in Auriga monitor is great. The screen is crisp and it has one of the friendliest OSDs (onscreen displays) that we've seen. No other vendor in this category opted to include such a large screen, and the system was more than a hundred dollars below our price ceiling. This system has one of the strangest inclusions of any machine we have ever reviewed — force feedback headphones. These headphones pulse and thump away on your head in time to the music. Strange, but novel.

Darren Ellis

Distributor	ComfortView
Phone	(03) 9543 6811
Online	N/A
Price	\$2,880
In short	Not a bad system, but maybe a little rich. Great monitor.

Dell Dimension XPS T550

Dell's entry in the sub-\$3,000 category has a strong list of specifications and as usual, it matches its Gateway rival in almost every feature. It starts with a 550MHz Intel Pentium III processor, although two

systems in this category had 600MHz processors, and 128M of RAM. Its 13.6G hard disk drive was about the same size as the Adelong, ComfortView, Gateway and THX systems, and its 17in monitor was also fairly standard in this category.

The XPS T550 was the only system in this category to have an 8x DVD drive. Given the rarity of data DVDs, this is unlikely to make much of a difference, although it's likely to be very fast at reading data CDs as well. A majority of the systems in this category used variations of the nVidia TNT2 graphics chip, but Dell chose a 3dfx Voodoo3 graphics card.

An interesting choice for 3D graphics; it scored well in the 3DMark 99 and below average in all the Viewperf tests. It came second in the Half-Life timedemo test. Half-Life uses 3dfx's proprietary Glide API, unlike the other tests that use OpenGL and DirectX. The XPS T550 will perform very well for applications that use Glide, but poorly for those that don't. A large number of games are programmed to use Glide, but there are exceptions.

In all the other tests we ran, the Dell was an average performer. And as usual, Dell



puts a little extra into the 'less important' aspects such as soundcard, speakers, mouse and keyboard.

Josh Mehlman

Distributor	Dell
Phone	1800 292 313
Online	http://www.ap.dell.com/au/
Price	\$2,851
In short	Average performance, mixed 3D.

Gateway Performance 500

In what is becoming standard fare for a machine from Gateway, the Performance 500 offers nothing new, but packs a little bit more into the bundle than a usual meat-and-potatoes system. It has fairly

standard components — 128M of RAM, Pentium III 500MHz processor and a 17in monitor, but there are a few differences.

The Performance 500 is one of the six systems in this category to have a DVD



drive, but it was one of the few of those that could handle playing a DVD full screen with little jerkiness. The monitor is crisp and clear, and relatively flat. The Sound Blaster Live soundcard and Boston Acoustics speaker system are a great addition to the home theatre experience of this machine.

For the most part, the system sat in our test results where you'd expect it to. The graphics weren't the best, the CPU and FPU results weren't the highest, and the Half-Life frame rate was low but good enough for gameplay. The hard drive, being one of the larger ones on offer (13.6G) rated second in the Ziff-Davis Business Disk WinMark 99 and third in the High-End Disk WinMark 99. The scores in the latter test impressed us.

This isn't the system with everything (for that you should look at the high-end Gateway machine in the following category), but it is a very good system considering its pricing and configuration.

Darren Ellis

Distributor	Gateway
Phone	1800 500 742
Online	http://www.gw2k.com.au/
Price	\$2,799
In short	Great for the gamer/enthusiast.

IBM Aptiva GOA

In a room full of beige PCs, IBM's Aptiva stood out. Not only does it have IBM's groovy but slightly odd case design, it's also black. We're not sure why it makes such a difference, but the colour really gives the Aptiva a presence that most PCs lack.

As usual, IBM has worked hard to make the PC easy to use for the less experienced. The keyboard includes controls for the CD and sound volume, keys for your browser and coloured buttons you can program to launch your favourite applications. The mouse has a scrolling control that, unlike a wheel controller, allows you to scroll quickly or slowly in either direction depending on how far you push it. It also has a well-designed help system.



Unfortunately, all this work on the outside was not matched by the inside. The Aptiva has a 450MHz Intel Pentium III processor, equal slowest in the category, and 64M of memory. Its 6G hard disk drive is the smallest in the category, as is the 15in monitor. Its graphics card and soundcard are also the less expensive varieties.

This led to performance figures that simply didn't match the rest of the field. The Aptiva came last in five tests, and its best score was fourth last.

To be fair, at \$1,999 it's significantly cheaper than all the other PCs in this category, but its poor components make it underpowered even for its low price.

Josh Mehlman

Distributor	IBM
Phone	1800 815 154
Online	http://pc.ibm.com/au/aptiva/
Price	\$1,999
In short	Looks good, but is underpowered.

Pioneer 2000 SOHO Pentium III

This is the second system in this category based around the Pentium III 600MHz processor, and for the most part it was a neck-and-neck race between the two for supremacy. The 2000 SOHO Pentium III was third in the Ziff-Davis CPUmark test,

but managed to scrape through to second place in the FPU WinMark test. Neither of the faster Intel machines could catch the slower Athlon in both of those benchmarks.

One of the system's strengths was the hard drive. It powered through the tests, garnering a good Business Disk WinMark score but blazing away in the High-End test, where it came second. Graphics-wise, it also did quite well — the frame rate for Half-Life was superb and the 3DMark 99 Max score couldn't be beaten, but for 2D it didn't do well.

For a SOHO machine, the system comes with some strange components. The competent Voodoo3 3000 video card would seem more at home in a gamer's machine, as would the 50x CD-ROM. Aside from these two quirks, it lives up to its expectations. This system has better speakers than the budget Pioneer, but this speaker and subwoofer combination can't hold their own against the the Altec Lansing or Boston Accoustics sets shipped by Dell and Gateway.



Darren Ellis

Distributor	Pioneer
Phone	(02) 9260 2888
Online	http://www.pioneercomputers.com.au/
Price	\$2,999
In short	An odd mix of gaming and SOHO.

THX Apollo

The Apollo's 128M of memory, 13G hard disk drive and 17in monitor were all on par for this category. Its bundled software was about as useful as the software that came with any of the other systems we looked at. THX included a 450MHz Intel Pentium III processor, equal slowest in this category. This led to some average results in the processor tests and a rather poor showing in the disk tests.

What the THX Apollo lost in processor speed, it gained in multimedia. It has an Apollo Riva

Editor's Choice



Adelong Athlon PC 550MHz

Highly commended Apple iMac DV Special Edition

The Adelong Athlon PC 550MHz was a clear winner in this category. Its AMD Athlon processor whipped every other system here in the important CPUmark 99 and also in the FPU WinMark99 test, beating the rest of the Intel-based pack. The other test results were equally pleasing, considering the system has half the RAM of most of the other systems.

The iMac just got sexier — more RAM, faster processor, better plastic casing, good DVD and audio and a highly palatable price. Not just for the Mac evangelists.

TNT2 Ultra graphics card, which uses the high-end TNT2 Ultra graphics processor. It has a 6x DVD drive, a reasonable soundcard and a beefy pair of Lonsen LS-880 speakers that are equal to, if not better than, the speaker/subwoofer combos of the Dell and Gateway systems. The keyboard has CD player and audio controls, as well as a small number of programmable application launch buttons.

Although it was crippled somewhat by its slower processor, the Apollo still performed well in all the graphics tests. Its 2D graphics was above average and its scores in the 3D graphics tests were all average or above.

You won't get a better multimedia experience under \$3,000.

Josh Mehlman

Distributor	THX
Phone	(02) 9262 1588
Online	N/A
Price	\$2,950
In short	Not the fastest, but great graphics and sound.



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Nov '99 Australian PC User

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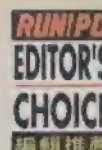
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brightly"



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PC USER Nov. '99

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"reached 98 points on a
possibility of 100".



Overclocker's
Paradise
GameStar computer
magazine April '99
Germany.



"The Five Star Award".
Hardwarezone.com April '99



"High score in the Slot 1
ATX category".
PC Intern June '99

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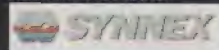
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SPECIFICATIONS: PCs UNDER \$3,000

Product	Athlon PC 550MHz	Alpha PIII-550	iMac DV Special Edition	SuperO P Class	ChromeStation 500T Professional	
Distributor	Adelong	Alpha	Apple	Beyond Computers	BlueFire	ComfortView
Phone	(02) 8344 3190	(03) 9415 9177	13 36 62	(02) 9648 0888	(02) 9439 4394	(03) 9543 6811
Online	http://www.adelong.com.au/	http://www.alpha-computer.com.au/	http://www.apple.com/	http://www.beyond-computers.com.au/	http://www.bluefire.com.au/	N/A
Price	\$2,945	\$2,999	\$2,999	\$2,999	\$2,999	\$2,880
Processor	AMD Athlon 550MHz	Intel Pentium III 550MHz	Apple PowerPC G3 400MHz	Intel Pentium III 600MHz	Intel Pentium III 500MHz	Intel Pentium III 450MHz
Secondary cache	512K	512K	512K	512K	512K	512K
Tested/maximum RAM and type	64M SDRAM (768M max)	128M SDRAM (768M max)	128M SDRAM (768M max)	128M SDRAM (1,024M max)	128M SDRAM (512M max)	64M SDRAM
Hard disk	13G Quantum	18G IBM Ultra ATA/66	13G Ultra ATA	9GB Quantum Fireball KA	8.4G Ultra ATA	13G Seagate Ultra ATA
Hard disk controller	Via Bus Master PCI IDE	Intel 82371AB/EB PCI Bus Master IDE	IDE controller	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE
Hard disk file system	FAT32	FAT32	HFS	FAT32	FAT32	FAT32
Graphics card	Matrox Millennium G400	nVidia Riva TNT2	ATI Rage 128	WinFast S320 TNT2 Ultra	Intel 810 chipset	nVidia Riva TNT2 M64
Video bus type	AGP	AGP	AGP	AGP	AGP	AGP
Video RAM	16M SGRAM	32M SDRAM	8M SDRAM	32M SDRAM	4M plus system RAM	32M
Video controller chip	Matrox Millennium G400	nVidia Riva TNT2	ATI Rage 128	nVidia Riva TNT2 Ultra	Intel 810 chipset	nVidia Riva TNT2 M64
Graphics driver version	4.11.01.1110	4.11.01.0208	N/A	4.11.01.0188	4.10.01.0107	4.11.01.0208
Monitor	17in Mitsubishi	17in Mitsubishi	15in	15in NEC	17in Philips 107s	19in Auriga
Tested resolution/colour depth/refresh rate	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz
CD-ROM/DVD drive	6x AOpen DVD	40x CD-ROM	4x DVD	40x CD-ROM	40x CD-ROM	6x DVD
Soundcard	Diamond Monster Sound MX300	Sound Blaster Vibra 128 PCI	Diamond Monster Sound MX300	Intel 810 chipset	Aureal Vortex2	N/A
Speakers	Altec Lansing ACS45.1	320W Genius	Built-in Harman Kardon Odyssey	480W Hi Fi speakers	Labtec speakers	Speaker and satellite combination
Modem	56K internal	N/A	56K internal	56K internal	56K internal	56K internal
OS available	Windows 98	Windows 95/98/NT, Linux, OS/2	Mac OS	Windows 98	Windows 98	Windows 98
Warranty	2 years RTB	2 years RTB parts and labour	1 year RTB	3 years limited	2 years RTB parts	5 years labour
Bundled software and accessories	PowerDVD	None specified	10/100 Ethernet connection	None specified	None specified	PC Cillin, 3D drawing software and more.

Product	Dimension XPS T550	Performance 500	Aptiva GOA	2000 SOHO Pentium III	Apollo
Distributor	Dell	Gateway	IBM	Pioneer	THX
Phone	1800 292 313	1800 500 742	1800 815 154	(02) 9690 2888	(02) 9262 1588
Online	http://www.ap.dell.com.au/	http://www.gw2k.com.au/	http://pc.ibm.com/au/aptiva/	http://www.pioneer-computers.com.au/	N/A
Price	\$2,851	\$2,799	\$1,999	\$2,999	\$2,950
Processor	Intel Pentium III 550MHz	Intel Pentium III 500MHz	Intel Pentium III 450MHz	Intel Pentium III 600MHz	Intel Pentium III 450MHz
Secondary cache	512K	512K	512K	512K	512K
Tested/maximum RAM and type	128M SDRAM (768M max)	128M SDRAM (384M max)	64M SDRAM (256M max)	128M SDRAM (768M max)	128M SDRAM (1,024M max)
Hard disk	13.6G Ultra ATA/66	13.6G Western Digital	6G IBM	6.4G Quantum Fireball	13G Quantum Fireball
Hard disk controller	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE
Hard disk file system	FAT32	FAT32	FAT32	FAT32	FAT32
Graphics card	3dfx Voodoo3 3000	nVidia Riva TNT2	S3	3dfx Voodoo3 3000	Apollo Riva TNT2 Ultra
Video bus type	AGP	AGP x2	AGP	AGP	AGP
Video RAM	16MB SDRAM	32M SDRAM	8M SDRAM	16MB SDRAM	32M SGRAM
Video controller chip	3dfx Voodoo3	nVidia Riva TNT2	s3	3dfx Voodoo3	nVidia Riva TNT2 Ultra
Graphics driver version	4.11.01.9132	4.11.01.0123	4.11.01.9540-8.03.03	4.11.01.0441-1.00	4.11.01.0191
Monitor	17in	17in EV700	15in IBM	15in Mitsubishi	17in Mitsubishi
Tested resolution/colour depth/refresh rate	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz
CD-ROM/DVD drive	8x DVD	6x DVD	40x CD-ROM	50x CD-ROM	6x DVD
Soundcard	Turtle Beach Montego II 320 Voice PCI	Sound Blaster Live	ESS Solo 1	Sound Blaster Live Value OEM	Sound Blaster 128 PCI
Speakers	Altec Lansing ACS-340	Boston Acoustics BA735	2 external monitor speakers	600W speaker and satellite combination	Lonsen LS-880
Modem	56K internal	56K internal	56K internal	N/A	56K internal
OS available	Windows 98	Windows 98	Windows 98	Windows 98	Windows 98
Warranty	3 years limited	3 years onsite parts and labour		2 years parts, 5 years labour	1 year RTB
Bundled software and accessories	MS Works Suite 99, Power game pack, McAfee VirusScan	MS Works Suite 99, McAfee VirusScan	KidDesk Internet Safe, IBM Internet Connection, IBM ViaVoice Office 99 and more	None specified	Lotus SmartSuite, WinDVD, 100 hours free Internet access

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SuperO P550

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Winfast S325 32MB TNT2 M64 Video Card
Diamond Monster MX300 Sound Card with A3D
Hi-Fi speakers
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SuperO P600

Supermicro MidiTower ATX Case
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USA Supermicro P6SBA board
128MB 100MHz SDRAM
Winfast S325 32MB TNT2 M64 Video Card
Diamond Monster MX300 Sound Card with A3D
Hi-Fi speakers
13.6GB Quantum Hard Drive
Sony 6x DVD
3.5" 1.44MB Diskette Drive
17" LG Digital Monitor
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Test results: PCs under \$3,000



Product	Business Winstone 99
Alpha PIII-550	27
Pioneer 2000 SOHO Pentium III	26.5
Beyond SuperO P Class	26
Gateway Performance 500	24.5
Dell Dimension XPS T550	22.6
Adelong Athlon PC 550MHz	22.5
BlueFire ChromeStation 500T	21.5
IBM Aptiva GOA	20.6
ComfortView Professional	19.5
THX Apollo	Unable to run

Product	High-End Disk WinMark
Alpha PIII-550	17,130
Pioneer 2000 SOHO Pentium III	13,200
Gateway Performance 500	12,400
Beyond SuperO P Class	10,050
ComfortView Professional	9,220
Dell Dimension XPS T550	8,990
Adelong Athlon PC 550MHz	8,890
THX Apollo	8,660
IBM Aptiva GOA	7,700
BlueFire ChromeStation 500T	6,820

Product	Viewperf Advanced Visualiser
Beyond SuperO P Class	13.8
Alpha PIII-550	13.29
THX Apollo	12.4
Adelong Athlon PC 550MHz	11.66
Gateway Performance 500	11.54
BlueFire ChromeStation 500T	11.25
Pioneer 2000 SOHO Pentium III	5.11
Dell Dimension XPS T550	4.837
IBM Aptiva GOA	4.22
ComfortView Professional	Unable to run

Product	CPUmark 99
Adelong Athlon PC 550MHz	51.2
Pioneer 2000 SOHO Pentium III	44.5
Beyond SuperO P Class	44.2
Alpha PIII-550	43.6
Dell Dimension XPS T550	41.2
THX Apollo	40.2
Gateway Performance 500	38.1
BlueFire ChromeStation 500T	38
IBM Aptiva GOA	38
ComfortView Professional	34.3

Product	Business Disk WinMark
Alpha PIII-550	7,190
Gateway Performance 500	3,920
Beyond SuperO P Class	3,570
Pioneer 2000 SOHO Pentium III	3,550
Adelong Athlon PC 550MHz	3,140
Dell Dimension XPS T550	3,140
THX Apollo	2,780
BlueFire ChromeStation 500T	2,430
ComfortView Professional	2,410
IBM Aptiva GOA	2,350

Product	Viewperf Data Explorer
Alpha PIII-550	14.06
Beyond SuperO P Class	14.04
Gateway Performance 500	13.15
THX Apollo	12.95
BlueFire ChromeStation 500T	12.6
Adelong Athlon PC 550MHz	5.56
Pioneer 2000 SOHO Pentium III	4.17
IBM Aptiva GOA	3.48
Dell Dimension XPS T550	0
ComfortView Professional	Unable to run

Product	3DMark 99 Max
Pioneer 2000 SOHO Pentium III	5,711
Alpha PIII-550	5,676
Adelong Athlon PC 550MHz	5,550
Beyond SuperO P Class	5,543
THX Apollo	5,280
Dell Dimension XPS T550	5,252
Gateway Performance 500	4,767
ComfortView Professional	4,225
BlueFire ChromeStation 500T	4,007
IBM Aptiva GOA	3,456

Product	Business Graphics WinMark
Adelong Athlon PC 550MHz	250
Alpha PIII-550	237
Beyond SuperO P Class	233
Pioneer 2000 SOHO Pentium III	221
THX Apollo	213
Dell Dimension XPS T550	206
Gateway Performance 500	185
BlueFire ChromeStation 500T	160
ComfortView Professional	152
IBM Aptiva GOA	149

Product	Viewperf Lightscape
Beyond SuperO P Class	1.64
Alpha PIII-550	1.6
THX Apollo	1.49
Gateway Performance 500	1.37
BlueFire ChromeStation 500T	1.3
Adelong Athlon PC 550MHz	1.06
Pioneer 2000 SOHO Pentium III	0.76
IBM Aptiva GOA	0.66
Dell Dimension XPS T550	0.51
ComfortView Professional	Unable to run

Product	FPU WinMark 99
Beyond SuperO P Class	3,030
Pioneer 2000 SOHO Pentium III	3,010
Adelong Athlon PC 550MHz	2,990
Alpha PIII-550	2,930
THX Apollo	2,780
Dell Dimension XPS T550	2,780
IBM Aptiva GOA	2,540
BlueFire ChromeStation 500T	2,530
Gateway Performance 500	2,500
ComfortView Professional	2,290

Product	High-End Graphics WinMark
Adelong Athlon PC 550MHz	730
Alpha PIII-550	673
Beyond SuperO P Class	654
Pioneer 2000 SOHO Pentium III	606
THX Apollo	602
Dell Dimension XPS T550	575
BlueFire ChromeStation 500T	523
Gateway Performance 500	521
ComfortView Professional	508
IBM Aptiva GOA	486

Product	Viewperf DesignReview
Alpha PIII-550	8.56
Beyond SuperO P Class	8.51
THX Apollo	8.04
Gateway Performance 500	7.37
BlueFire ChromeStation 500T	6.47
Adelong Athlon PC 550MHz	5.06
Dell Dimension XPS T550	1.44
Pioneer 2000 SOHO Pentium III	0
IBM Aptiva GOA	0
ComfortView Professional	Unable to run

Product	Half-Life timedemo
Pioneer 2000 SOHO Pentium III	47
Dell Dimension XPS T550	40.5
Beyond SuperO P Class	38
Alpha PIII-550	36
THX Apollo	35
Adelong Athlon PC 550MHz	31.9
BlueFire ChromeStation 500T	31
Gateway Performance 500	27.5
IBM Aptiva GOA	23.5
ComfortView Professional	20.5

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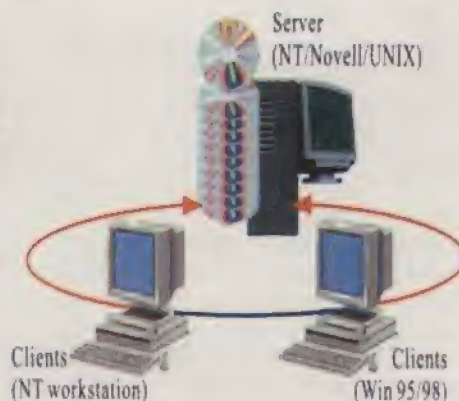
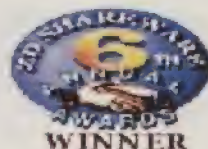
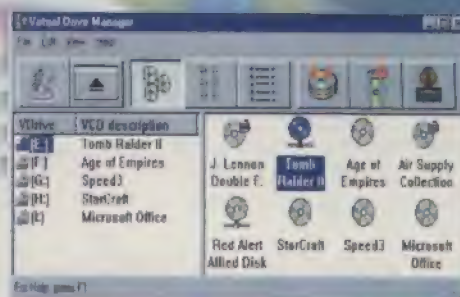
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Ultimate systems

This is the final category in this year's reviews, and the one APC enjoys the most. This is the category where vendors try to make us drool. Our only stipulation was that the system must have a CD-ROM or DVD drive, Windows 98 installed and a minimum of 64M of RAM. There were no price restrictions; the sky was the limit. Last year, APC was delighted with some of the submissions, but this year they were a little tepid. Most of the vendors were a little timid when it came to packing out systems and therefore the price. The only

vendors to go all out were Gateway, Beyond and Alpha Computer.

Last year's Ultimate machines boasted less power than this year's budget category, which is an indication of the speed at which technology changes. The average price for this year's Ultimate machines is \$4,600. Last year this would have scored you a Pentium II 400 or 450MHz with 64M of RAM, a 4G hard drive, a 15 to 17in monitor and a DVD, if you were lucky. This year, the average Ultimate system comes with nothing less than a 600MHz Pentium III or 600MHz

Athlon, 128M of RAM, a 13G hard drive, a 17in monitor and a DVD drive. Surprisingly for such highly configured systems, there were no 21in monitors. Two of our Ultimate systems also came with CD-R/RW drives installed.

As mentioned in the introduction to 'Systems under \$3,000', none of these machines came with hardware DVD decoder cards, and not all ran perfectly in full-screen mode with the software players. The exception to this rule was the Gateway Performance 600XL, which ran seamlessly and had fabulous audio.

Alpha Computer Athlon 650

In a world dominated by Intel processors, it's great to see a machine that has not only followed a different path, but gives Intel a good run for its money. Alpha and Gateway are the only two vendors that took us seriously when we said 'money is no object' and 'tease us', for this category. Sure, this may be the third-most expensive machine here, and \$400 more than the fourth-most expensive system, but that's not the point.

So what do you get for your hard-earned cash? The specifications that truly stand out are the AMD Athlon 650MHz processor (Pioneer is the only other to follow suit here), the 19in monitor, excellent speakers and, wait for it, the two 20G Seagate hard drives in RAID configuration. Even if that is overkill, if you take one of the drives out and drop the price down, you've still got a great machine.

Usually a system so encumbered with components tends to bog down under pressure, but not this one. It topped the 2D processing tests with a very high lead in the Ziff-Davis High-End Graphics WinMark. It was just behind the Pioneer

system in the CPUmark 99 and FPU WinMark 99 tests, and was the fastest in the Business Winstone 99 test. We're not entirely sure where this system fits in — the gaming results (3DMark 99 Max was not so good, the Half-Life fps was fantastic) plus the monitor, DVD drive and speakers lend itself to a gaming machine, but the two hard drives in the RAID configuration tend to point towards a high-end corporate box. All up though, if you want a top-class home theatre/gaming/fun machine and can afford the extra, then go for it.

Darren Ellis

Distributor	Alpha Computer
Phone	(03) 9415 9177
Online	http://www.alphacomputer.com.au/
Price	\$5,390
In short	Not so expensive when you look at all the components.

Beyond Computers SuperO S Class Server

Beyond put its top-of-the-line, top-dollar PC in the same enormous server case as the SuperO P2 Speedo we reviewed last year. Like last year's system, there's still an awful lot of spare room inside. This time around, Beyond has packed a few more extras into the system, so perhaps there's only enough room to swing a smallish cat.

The S Class seems a little confused about

what sort of role it best fulfils. Is it a server? Is it a high-end desktop? Is it a games machine? Despite the name, the S Class Server has several non-server features, such as a CD-RW drive, a Matrox Millennium G400 MAX graphics card and a Diamond Monster MX300 soundcard. Then there's the absence of



speakers, despite the presence of a fairly high-end soundcard. The monitor is a little small for a high-end desktop or games system, but may be too big for a server. Its enormous 256M of memory and SCSI disk controller point to a server, but 9.1G of storage is hardly enough for most server applications.

The Beyond was not exactly a star performer. Despite its SCSI disk interface, its scores were fairly poor in the Ziff-Davis Business and High-End Disk WinMark tests, as well as the Business Winstone 99 test. Its 3D graphics performance was satisfactory, but it performed badly under the Half-Life game test. Similarly, its processor





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performance was satisfactory, but its Pentium III couldn't beat the AMD Athlon.
Josh Mehlman

Distributor Beyond Computers
Phone (02) 9648 0888
Online <http://beyondcomputers.com.au/>
Price \$5,999
In short PC with an identity crisis. Decent performance, but we're unsure what it's suited to.



In short

You'll be digging deep to afford this one, but some things are worth it.

Dell Dimension XPS T600

Before delving into the nitty gritty of this machine, it's necessary to have a short rave about the video card it used. At first APC was disappointed, but when the drivers were upgraded for the nVidia GeForce card (still new at the time of review) the performance increase was phenomenal, especially for those programs that are optimised for the GeForce. When optimised programs (that is, games) are released, look out world. The only test here that demonstrated this performance increase was the Viewperf test. If it wasn't double the next-highest score, it was three or five times the frames.

The rest of the system's specifications are par for the course for this category: 600MHz Pentium III and 128M of RAM. The only other indulgences are a 20.4G hard drive and a 19in monitor. For once, Dell is not the leader of the pack in terms of performance — the Ziff-Davis CPUmark 99 and FPU WinMark 99 scores are the second slowest (just above Gateway). The hard drive is not the fastest of those listed here, settling into the middle of the pack, but when you compare the speeds right across the board you'll note that the drive is still very, very fast.

The system is strong for multimedia; it has a 19in monitor and amazing audio. For years APC has been a big fan of the Altec Lansing speakers shipped with high-end Dell machines, and this system's four-speaker and subwoofer setup is fabulous.
Darren Ellis

Distributor Dell
Phone 1800 292 313
Online <http://www.ap.dell.com/au/>
Price \$4,799

Gateway Performance 600XL

Gateway's Performance 600XL is for those who must have the latest. There was a time when three speakers were considered enough, but now you need five speakers for full 3D surround sound. The Boston Acoustics Digital Media Theatre speakers provide excellent audio quality when combined with the Sound Blaster Live soundcard. As far as we know, there are only two uses for surround sound on a PC: watching movies and playing games.



Watching movies shouldn't be a problem on the 21in monitor with the 6x DVD drive. Playing games won't be a hassle either thanks to the nVidia Riva TNT2 graphics card. The 34G hard disk drive will give you enough space for a fair number of games. The CD-RW drive should be handy for backing up your system and making legal backup copies of your software.

Gateway may have dropped the ball a little in providing a Riva TNT2 graphics card instead of a GeForce, but by the time you read this, chances are you'll be able to select a GeForce

card for your system if a TNT2 isn't enough.

The Gateway's hard disk drive was fast enough to compete with a SCSI RAID system in the Alpha Athlon 650. Its scores in 3DMark 99 Max and the Half-Life timedemo were reasonable, and it came second to the Dell's astounding GeForce card in all the Viewperf tests. As a contender for the most expensive system in this category,

you sure get a lot for the price.

Josh Mehlman

Distributor Gateway
Phone 1800 500 742
Online <http://www.gw2k.com.au/>
Price \$5,699
In short Want it all? Here it is.

Packard Bell Platinum 600

Packard Bell has kept a low profile for a very long time, so it's great to review one of its systems. Not having reviewed one for a while, APC couldn't help but be reminded of the company's past mistakes; namely shoddy service and substandard systems. Packard Bell assured APC this was the reason for its two-year hiatus. It also assured APC that this phase is over, and more of its systems will be gracing these pages in the next year.

Packard Bell has never billed itself as a vendor of high-performance, latest and greatest machines. Rather it is the friendly, affordable face of computing — you take the computer home, you plug it in and off you go. Certainly the specifications and price point are quite attractive, but what's under the hood?

Based around a 600MHz Pentium and 128M of RAM, the Platinum 600 is not going to blow your socks off — at least, not until you start playing games on it. The Ziff-Davis CPUmark 99 and FPU WinMark 99 scores are below average, as are the 2D



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results, but the real difference is in the Half-Life timedemo test. Its Voodoo3 3000 card scored the highest frame rate of any card — an amazing 52fps.

The system comes with a CD-RW drive, a huge bundle of software (too many to list in the specification table) and a great set of speakers. However, it only comes with a one-year warranty, which is less than that provided by any other vendor featured.

Darren Ellis

Distributor	Packard Bell
Phone	(02) 9700 5052
Online	http://www.packardbell.com.au/
Price	\$3,499
In short	Highly competitive pricing but its performance is a little weak.

Pioneer Power PC K7-650MHz

As one of the first AMD Athlon-based systems that APC has had the opportunity to review, we expected a little more. When a system boasts one of the fastest processors in the world, you'd expect it to have a little more pizzazz.



Instead, Pioneer has put together a system that has a very fast processor, and that's all.

Pioneer's Power PC K7-650MHz is comparable in specifications to the similarly priced Packard Bell and THX systems. The Pioneer has the same size memory, hard disk drive and monitor as the other two. It has a 3dfx Voodoo3 3000 graphics card just like the Packard Bell and a 6x DVD drive like the THX.

As we've noted previously, Intel and AMD put a large premium on their fastest processors. Pioneer has probably paid hundreds of dollars extra to get a 650MHz Athlon rather than the 600MHz of the THX system. To compensate, Pioneer has scrimped on

components like the soundcard, speakers and graphics card.

Given its processor, you would expect the Pioneer to top just about every test. However, its relatively slow hard disk drive cut it down to third place in the disk tests, and its graphics card gave an unimpressive performance in the OpenGL-based Viewperf tests.

In terms of sheer processing power, you won't find a faster PC at the moment, but the rest of the system is half-baked. This might be an advantage in certain business contexts, but most people want more from a PC.

Josh Mehlman

Distributor	Pioneer
Phone	(02) 9690 2888
Online	http://www.pioneercomputers.com.au/
Price	\$3,890
In short	Powerful processing, but that's all.

THX The Probe

APC wasn't particularly blown away by any of the THX systems submitted for review, but The Probe had more redeeming features than any of the others. For the price point, THX has managed to cram a few extra goodies into the system, which should keep the more discerning punters happy. These are the Athlon processor, the CD-RW, the LS-120 disk drive and the Matrox Millennium G400 Max graphics card.

The Athlon processor allowed it to come third in both the Ziff-Davis CPUmark 99 and FPU WinMark 99 benchmarks, behind the two faster Athlons. This is the only high-end system, and the fourth overall, that we could not get the Business Winstone 99 test to run on. The hard drive was slowest, but there were a few SCSI drives sprinkled in there so it's not all that bad. Graphically, the system was a heady achiever, scoring highly, but behind the two Voodoo3 3000 cards in both of the Ziff-Davis 2D graphics benchmarks. It was the second-fastest card in the 3D-Mark 99 test,



Editor's Choice



Dell Dimension XPS T600

Highly commended Gateway Performance 600XL

It was very hard to choose a winner in this category. In the end it came down to the Dell and the Gateway machines, both of which are great systems. These machines are not so much PCs as full entertainment packages. Throw the stereo out — you have to hear these systems to believe them. Both machines have stunning graphics and excellent components, at a good price. These machines feature the 600MHz Intel Pentium III processor and 128M of RAM.

For what it packs, the Gateway Performance 600XL is worth the price tag, although it's still very expensive. The Dell Dimension XPS T600 comes in with slightly lower specifications and is subsequently easier on the wallet.

achieving a very high score, and its Half-Life frame rate was nothing to sneeze at, although not the highest.

The Lonsen speaker set and the soundcard that came with the system are excellent, which makes watching DVDs a pleasure, although they were slightly jerky. A decent system for the home, but not so good on the work desk.

Darren Ellis

Distributor	THX
Phone	(02) 9262 1588
Online	N/A
Price	\$3,995
In short	Plenty of features for a decent price.

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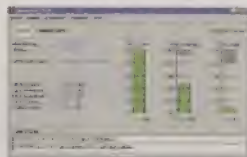


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Online	http://www.alphacomputer.com.au/	http://beyondcomputers.com.au/	http://www.ap.dell.com/au/	http://www.gw2k.com.au/
Price	\$5,390	\$5,999	\$4,799	\$5,699
Processor	AMD Athlon 650MHz	Intel Pentium III 600MHz	Intel Pentium III 600MHz	Intel Pentium III 600MHz
Secondary cache	128K	512K	512K	512K
Tested/maximum RAM and type	128M SDRAM (768M max)	256M SDRAM (1,024M max)	128M SDRAM (768M max)	128M SDRAM (384M max)
Hard disk	Two 20G Seagates in RAID config	9.1G Seagate Cheetah (SCSI)	20.4G	34G IBM Ultra ATA/66
Hard disk controller	AMD 756 PCI Bus Master Dual IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE	Intel 82371AB/EB PCI Bus Master IDE
Hard disk file system	FAT32	FAT32	FAT32	FAT32
Graphics card	nVidia Riva TNT2	Matrox Millennium G400 Max	nVidia GeForce	nVidia Riva TNT2
Video bus type	AGP	AGP	AGP	AGP
Video RAM	32M SDRAM	32M SDRAM	32M SDRAM	32M SDRAM
Video controller chip	nVidia Riva TNT2	Matrox Millennium G400	nVidia GeForce	nVidia Riva TNT2
Graphics driver version	4.11.01.0208	4.11.01.1300	4.12.01.0353	4.11.01.0123
Monitor	19in Philips	17in LG Flatron	19in	21in Mitsubishi
Tested resolution/colour depth/refresh rate	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz
CD-ROM/DVD drive	6x DVD (check for CD)	6x DVD	8x DVD	6x DVD
Soundcard	Sound Blaster Live Value	Diamond Monster MX300	Sound Blaster Live Value	Sound Blaster Live
Speakers	Altec Lansing CS54	N/A	Altec Lansing ACS-340	Boston Accoustics Digital Media Theatre Speakers
Modem	56K internal	56K internal	56K internal	56K internal
OS available	Windows 95/98/NT, Linux, OS/2	Windows 98/NT	Windows 98	Windows 98/NT
Warranty	2 years RTB parts and labour	3 years limited	3 years limited	3 years onsite parts and labour
Bundled software and accessories	None specified	CRX120 CD-RW	MS Works Suite 99, McAfee VirusScan	MS Works Suite 99, McAfee VirusScan

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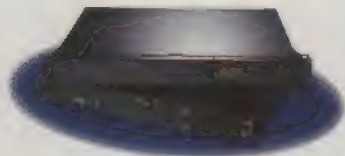
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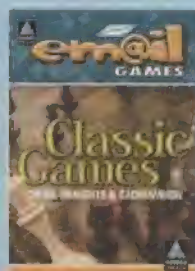
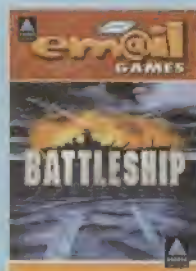
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Online	http://www.packardbell.com.au/	http://www.pioneercomputers.com.au/	N/A
Price	\$3,499	\$3,890	\$3,995
Processor	Intel Pentium III 600MHz	AMD Athlon 650MHz	AMD Athlon 600MHz
Secondary cache	512K	128K	128K
Tested/maximum RAM and type	128M SDRAM	128M SDRAM (768M max)	128M SDRAM (768M max)
Hard disk	13G	13G IBM Ultra ATA/66	13G Quantum Fireball
Hard disk controller	Intel 82371AB/EB PCI Bus Master IDE	AMD 756 PCI Bus Master Dual IDE	AMD 756 Bus Master Dual IDE
Hard disk file system	FAT32	FAT32	FAT32
Graphics card	3dfx Voodoo3 3000	3dfx Voodoo3 3000	Matrox Millennium G400
Video bus type	AGP	AGP	AGP
Video RAM	16M SDRAM	16M SDRAM	32M SDRAM
Video controller chip	3dfx Voodoo3 3000	3dfx Voodoo3 3000	Matrox Millennium G400
Graphics driver version	4.11.01.0442-1.00	4.11.01.0441-1.00	4.11.01.1110
Monitor	17in	17in Mitsubishi	17in Mitsubishi
Tested resolution/colour depth/refresh rate	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz	1,024 by 768/16-bit/85Hz
CD-ROM/DVD drive	24x CD-RW	6x DVD	6x DVD
Soundcard	PCI288-Q3D II	Creative PCI 64 OEM	Sound Blaster Live
Speakers	Speaker and satellite combination	600W speaker and satellite combination	Lonsen LS-880
Modem	56K internal	N/A	56K internal
OS available	Windows 98	Windows 98	Windows 98/NT
Warranty	1 year limited hardware	2 years parts, 5 years labour	1 year RTB
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Product Business Winstone 99

Alpha Athlon 650	28.3
Pioneer Power PC K7-650MHz	27.8
Gateway Performance 600XL	27.1
Beyond SuperO S Class Server	26.9
Dell Dimension XPS T600	26.5
Packard Bell Platinum 600	25.1
THX The Probe	Unable to run

Product High-End Disk WinMark

Alpha Athlon 650	23,500
Gateway Performance 600XL	20,400
Pioneer Power PC K7-650MHz	16,700
Beyond SuperO S Class Server	15,400
Dell Dimension XPS T600	13,000
Packard Bell Platinum 600	11,550
THX The Probe	7,910

Product Viewperf Advanced Visualiser

Dell Dimension XPS T600	71.42
Gateway Performance 600XL	13.41
THX The Probe	12.68
Alpha Athlon 650	11.21
Beyond SuperO S Class Server	10.42
Pioneer Power PC K7-650MHz	6.92
Packard Bell Platinum 600	5.02

Product CPUmark99

Pioneer Power PC K7-650MHz	59.9
Alpha Athlon 650	58.1
THX The Probe	55.5
Beyond SuperO S Class Server	44.7
Packard Bell Platinum 600	44.1
Dell Dimension XPS T600	43.8
Gateway Performance 600XL	43.5

Product Business Disk WinMark

Gateway Performance 600XL	7,180
Alpha Athlon 650	6,870
Pioneer Power PC K7-650MHz	5,420
Dell Dimensions XPS T600	5,080
Beyond SuperO S Class Server	4,200
Packard Bell Platinum 600	3,040
THX The Probe	2,850

Product Viewperf Data Explorer

Dell Dimension XPS T600	27.48
Gateway Performance 600XL	14.49
Alpha Athlon 650	9.2
Beyond SuperO S Class Server	8.09
THX The Probe	6
Pioneer Power PC K7-650MHz	5
Packard Bell Platinum 600	4.07

Product 3DMark 99 Max

Pioneer Power PC K7-650MHz	6,092
THX The Probe	5,894
Beyond SuperO S Class Server	5,734
Packard Bell Platinum 600	5,630
Gateway Performance 600XL	5,507
Alpha Athlon 650	5,359
Dell Dimension XPS T600	5,098

Product Business Graphics WinMark

Alpha Athlon 650	284
Pioneer Power PC K7-650MHz	277
THX The Probe	267
Beyond SuperO S Class Server	235
Dell Dimension XPS T600	234
Gateway Performance 600XL	209
Packard Bell Platinum 600	202

Product Viewperf Lightscape

Dell Dimension XPS T600	3.158
Gateway Performance 600XL	1.52
Alpha Athlon 650	1.5
Beyond SuperO S Class Server	1.25
THX The Probe	1.14
Packard Bell Platinum 600	0.75
Pioneer Power PC K7-650MHz	0

Product FPU WinMark 99

Pioneer Power PC K7-650MHz	3,540
Alpha Athlon 650	3,530
THX The Probe	3,250
Packard Bell Platinum 600	3,040
Beyond SuperO S Class Server	3,030
Dell Dimension XPS T600	2,980
Gateway Performance 600XL	2,980

Product High End Graphics WinMark

Alpha Athlon 650	902
Pioneer Power PC K7-650MHz	820
THX The Probe	795
Dell Dimension XPS T600	668
Beyond SuperO S Class Server	652
Gateway Performance 600XL	602
Packard Bell Platinum 600	592

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Dell Dimension XPS T600	21.72
Gateway Performance 600XL	8.35
Alpha Athlon 650	7.9
Beyond SuperO S Class Server	5.77
THX The Probe	5.48
Pioneer Power PC K7-650MHz	2.44
Packard Bell Platinum 600	0

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Packard Bell Platinum 600	54.5
Pioneer Power PC K7-650MHz	52
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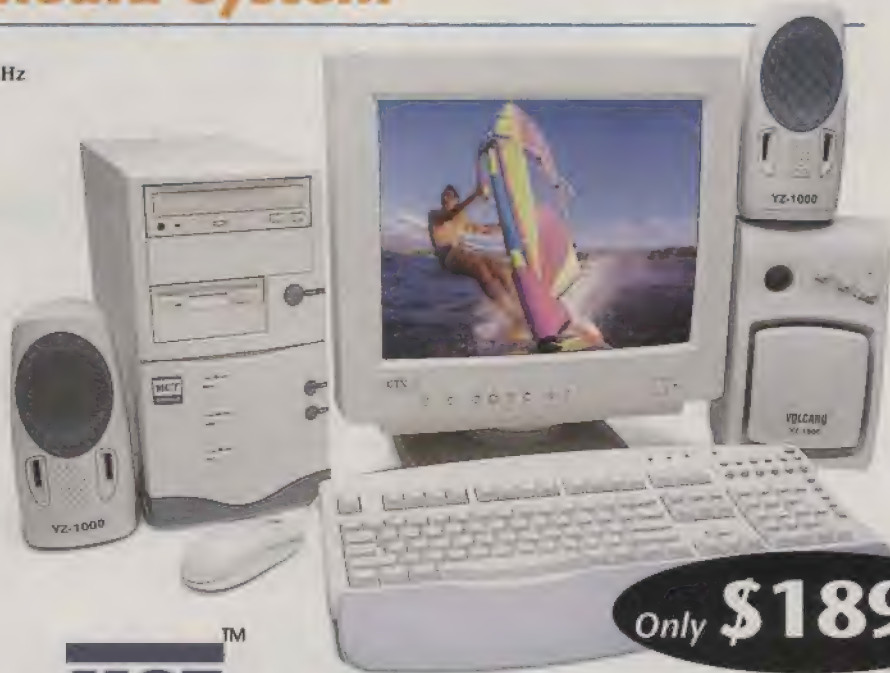


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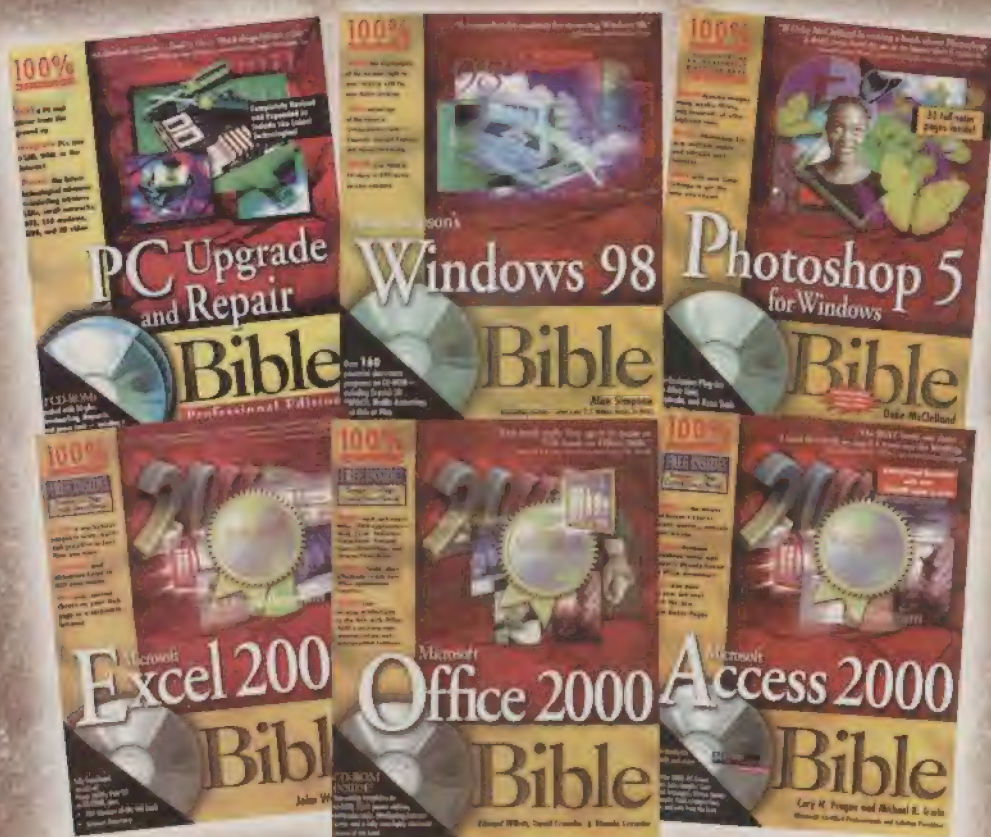
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PROCESSORS: the new wave

This year's Microprocessor Forum in San Jose saw a spate of new processor announcements. Itanium (formerly Merced) details were revealed, and the future of microprocessor architecture was unveiled. **Josh Mehlman** reports.

This year's Microprocessor Forum saw a frenzy of announcements from major microprocessor manufacturers and designers. The area that saw the most action was processors for servers. All vendors are moving towards multilevel cache memory and higher internal bandwidth for their processors, but vendors are taking different approaches to parallelism.

Parallelism is the processor's ability to simultaneously process different elements within a program, making it run faster. There are two broad categories: instruction level parallelism (ILP) and thread-level parallelism (TLP). ILP means having a large number of execution units within a processor and then breaking a single program into chunks to be fed through the execution units. This breaking up process can occur either within the processor, through out-of-order execution, or in the compiler.

TLP involves having several separate threads of instructions (possibly from different programs) and either running them through the same processor to maximise efficient use of processing resources, or running the different threads through different processors. Recent advances in chip manufacturing have made it possible to include more than one processor core on a single chip. Several vendors plan to use this development.

In order to take advantage of TLP, a processor needs both a multithreaded operating system and an application, such as Web serving, that has many threads.

Analysts believe the diversity of approaches is healthy. Insight 64 analyst Nathan Brookwood said, "There are a lot of

clever people in the industry taking very different approaches to maximising performance. In time we will see which approaches are adopted by the marketplace and which fall by the wayside."

The improvements parallelism makes in performance are not proportional; doubling the number of execution units or processors does not double the performance, and it is unclear which approach provides the greatest performance boost.

Itanium

Intel released technical and architecture details of the Itanium (previously known to the world as Merced) processor, but remained secretive about some of its more basic details.

Itanium will be the first processor to use the IA-64 architecture developed by Intel and Hewlett-Packard. According to Harsh Sharangpani, Intel's principal engineer, it will use a level 2 cache integrated on the chip and a level 3 cache in the same package as the processor, running at full clock speed. Sharangpani said that Itanium will have 128 integer and 128 floating-point registers, as well as four integer and four MMX/floating-point execution units. These will allow it to retire up to 20 simple floating-point calculations per clock cycle, 12 double-precision floating-point calculations per clock cycle and eight integer calculations per clock cycle.

Sharangpani maintains that Intel is on schedule to launch Itanium around the middle of next year. He said that Intel currently has four operating systems running on Itanium, including 64-bit versions of Windows 2000 and Linux. Intel

should finish functional testing by the end of this year, and prototype systems are due early next year. Although Sharangpani produced a functional Itanium chip at the forum, he did not reveal the chip's expected clock speed, power consumption, performance or cost.

Itanium is based on Intel and Hewlett-Packard's Explicitly Parallel Instruction Computing architecture, which relies on the compiler to break the program into several parts that feed through multiple execution units within the processor.

Although Intel's Itanium will execute IA-32 (x86) instructions natively to ensure backward compatibility, its new A-64 instruction set will require entirely new software. Other processor manufacturers announcing products at the Forum preferred to make the best of their current instruction sets.

Power4, Alpha and SPARC

IBM's chief architect Jim Kahle announced details of the new Power4 chip, which will be fully binary compatible with IBM's existing 64-bit PowerPC chips. Expected to ship in 2001, the Power4 will contain two processor cores within the one chip. The two cores will share a level 2 cache, and a level 3 cache will be externally connected to the chip.

IBM envisions workstations using one Power4 chip, but also intends to produce a four-chip module for servers, using a 500MHz bus to connect between the processors. The processor will run at greater than 1GHz.

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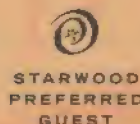
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
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
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Continued from page 127

Dr Joel Emer, Compaq's principal member, technical staff, Alpha Development Group, said the group has taken a different approach for its EV8 processor, due for release in 2002 or 2003. The Alpha EV8 will run at speeds of between 1.2 and 2GHz, and simultaneously run several threads of instructions through its processing units, ensuring they are all in constant use. Each CPU will present itself as four 'thread processing units' (TPUs), and the software can treat each TPU as a separate processor.

Fujitsu subsidiary, HAL Computer Systems, announced its SPARC64 V processor for eight to 64-processor enterprise and scientific servers. HAL spokesperson Michael Shebanow said the SPARC64 V, due in 2001, will be compatible with the UltraSPARC II and will run at 1GHz. Following the strong trend for larger caches, the SPARC64 V will feature a 512K on-chip level 2 cache and a 16M level 3 cache.

AMD goes out on a limb

As well as announcing future plans for the Athlon processor, AMD vice-president for engineering Fred Weber also discussed

AMD's plans to take on Intel's Itanium processor and IA-64 architecture. The company launched a 700MHz Athlon processor, using a 0.25-micron production process and demonstrated an 800MHz Athlon using a 0.18-micron process. Weber said AMD is currently producing 0.18-micron Athlons, but did not say when they will be available.

Versions of Athlon to be released next year will include 1M or 2M level 2 caches running at full processor speed, he said. The frontside bus speed will be increased from 200 to 266MHz. In addition, AMD will release a two-processor chipset, which will have a 266MHz bus and use DDR (double data rate) DRAM. It will feature 4x AGP and a 64-bit 66MHz PCI bus.

Weber also announced AMD's much-discussed competitor to Intel's IA-64 architecture. Dubbed x86-64, it is a 64-bit extension of the current x86 architecture. Betting that IA-64 uptake will be slow, AMD intends to retain compatibility with existing x86 software, while still improving performance. Although the integer part of the instruction set will remain relatively unchanged, AMD will make some changes to the floating-point instruction set, according to Weber.

Finally, AMD announced its Lightning Data Transport (LDT) internal bus, which will significantly increase I/O bandwidth. The Athlon processor will remain connected to the chipset's north bridge (memory controller) using the EV6 bus, but LDT will connect the north bridge to I/O controllers and to north bridge chips of other Athlon processors for multiprocessor systems.

Desktop designs

While server announcements dominated the forum, details of new desktop, media and embedded processors were also released at the conference.

Intel revealed details of its next generation Pentium III chip, codenamed Coppermine. Coppermine will use Intel's 0.18-micron production process, which is already being used to produce the mobile Pentium II 'Dixon' and Pentium III processor. The new chip contains a 256K level 2 cache integrated into the chip (similar to the way the Celeron has 128K integrated), and the cache system has been redesigned to increase its bandwidth and reduce latency, according to Intel's product architecture manager Jim Wilson. Intel also increased the number of buffers to optimise

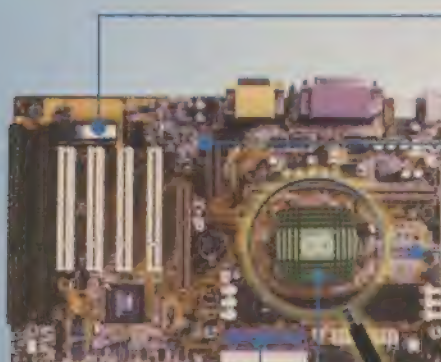


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the processor for the 133MHz bus. Intel released figures from its own tests that showed a 12% to 20% improvement in performance over the current Pentium III chip at the same clock speed.

The new processor has been released running at speeds up to 733MHz, but Intel released performance figures from the Coppermine running at 800MHz, claiming it is capable of even higher speeds.

A new mobile processor from Intel will be the first to feature Intel's Speed Step technology (formerly codenamed Geyserville). This allows the processor to adjust its clock speed and voltage depending on whether the notebook is plugged into an external power source or running on batteries. Wilson claimed this allows the processor to work at 80% of the performance while consuming 50% of the power.

On the PowerPC front, Motorola announced plans to upgrade the recently released G4 processor. Motorola spokesperson Naras Iyengar said that Motorola wants to increase the frequency of the processor, and also to improve the number of instructions the processor can perform per clock cycle. *Microprocessor Report* editor-in-chief Keith Diefendorff commented that buyers still view frequency as the strongest

indicator of performance, particularly in the low-end and retail markets. According to Iyengar, changes to the G4 include lengthening the pipeline from four to seven stages, adding two more execution units, widening the internal bus from 128 to 256 bits, putting the level 2 cache on the chip and adding support for a level 3 cache. He said the new G4, due to ship next year, will be produced using a 0.13-micron production process and will run at speeds in excess of 700MHz.

Media processing MAJC

Sun Microsystems revealed the first processor based on its MAJC architecture.

Sun's chief architect Marc Tremblay said because most modern processors are old designs that have been upgraded, they contain many inefficiencies. Processors such as Intel's Pentium III have separate execution units and registers for integer, floating-point and SIMD calculations. Tremblay said MAJC was designed to have one set of registers capable of handling all data, and each execution unit within the processor can process all calculations.

Sun's MAJC-5200 contains two separate processor units within the same chip, each

containing four execution units. MAJC-5200 also includes a graphics preprocessor, which can compress 3D graphics information by a factor of 20 times.

Sun believes MAJC's ability to process all types of data makes it suitable for a wide variety of applications previously monopolised by ASICs (Application-Specific Integrated Circuits), such as network interfaces, set-top boxes and graphics processors. Sun claims MAJC-5200 has enough power, for example, to decode six video streams and encode one stream in a videoconferencing system. If used as a 3D graphics accelerator, Sun claims the MAJC-5200 could draw from 62 million to 92 million triangles per second, well beyond the capabilities of current graphics chips.

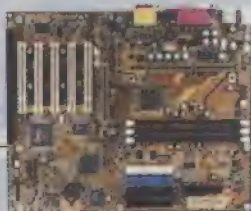
MAJC chips can be programmed in the high-level C++ and Java languages. However, only the Java virtual machine can automatically extract the parallelism from the code in order to efficiently use the two processors in the MAJC-5200 chip, according to Tremblay.

The MAJC-5200 will run at 500MHz and be produced under a 0.22-micron process. Samples are expected to be available in the second quarter of next year. ■

Camino + IDE RAID + RAM BUS = MEGAPOWER

CT-6CTR

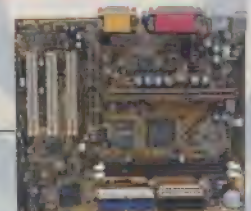
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- Embedded PCI audio with AC97 CODEC and support soft modem riser (AMR)
- Optional Creative CT1373 audio chip with 2-speaker HRTF 3D
- **Flash BIOS write protection** against unauthorized access. With Trend **ChipAway** Virus to ensure virus-free booting procedure



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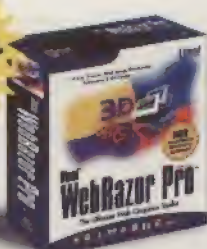


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beyond xml

the future of markup languages

XML — the heir apparent to the Internet's lingua franca, HTML — has the potential to drive Internet-based communication to new levels, and will prove extremely important in future applications. **Craig Kirkwood** explains how.

In the early days of computing, data processing was all about numbers and structured information. To store, retrieve and analyse that kind of information, the database became the original killer app. In fact it was the *only* app.

When information processing moved to the desktop and relational databases sprang up on every server, the need for a common tongue to interrogate structured data became obvious. The Structured Query Language (SQL) emerged out of necessity as the language of relational data. Regardless of its faults, SQL remains the lingua franca of databases today.

Unfortunately, the world doesn't consist only of structured, related units of information that can be neatly defined as currencies, dates, numbers or letters. It consists of rambling letters, instructions, shopping lists, moving images, colour photographs and the music of many instruments. And until now, there's been no simple way to create unity among these disparate media in order to store, present, transmit and display them. That's why extensible markup language (XML) is important: it is a blueprint for creating order out of analog chaos.

XML allows the structuring of data that doesn't conveniently fall into the categories easily defined in relational

databases. It's referred to as a syntax, or metalanguage, because it describes the rules of the language rather than the language itself. In other words, it's a set of agreed rules from which a language can be created for the specific uses of a particular enterprise or domain. If the momentum continues, it could well be the Babel Fish of information technology — the universal communications tool for a common tongue between applications.

Without such a standard, it will be impossible for computing to move forward with certainty. Without a common development platform, ecommerce and Web-based applications will remain a squabbling, dissonant cacophony. That standard platform is not an operating system (although a standard OS would be nice), but an agreed method by which information can be structured, packaged and transmitted, regardless of the operating system or the communications medium.

If XML is a metalanguage, actual languages or document type definitions (DTDs) that adhere to its syntax are required before it can be useful. Since it appears that XML is here to stay, the scramble is on to define DTDs for every industry and information type. The first one to acquire a critical mass of support will likely control the language for that

particular field, although it remains to be seen whether there is any substantial commercial benefit when achieving this leadership position.

The remainder of this article is a discussion of some of the major XML-based applications and how they are likely to affect the future of markup.

SMIL — you're online

One of the more interesting applications of XML is the Synchronised Multimedia Integration Language (SMIL, pronounced smile). SMIL is an attempt to create a language for the use of time-based media on the Web. It was first proposed at the end of 1995 but didn't get to World Wide Web Consortium (W3C) draft stage until some two years later. And it really wasn't until the release of the second draft (codenamed Boston) earlier this year that the proposal began to gather speed.

SMIL is not an entirely new concept. The Standard Generalised Markup Language (SGML) community proposed a language years ago called HyTime, but it was criticised as overly complex and was never widely adopted. Although it is less robust than HyTime, SMIL has the strength of RealNetworks, Microsoft and Netscape as authors, as well as those from related

industries such as interactive television and multimedia.

With RealNetworks' RealPlayer, Apple's QuickTime and Macromedia's Shockwave all jockeying for pole position in the race to dominate Web multimedia, support for SMIL may play a pivotal role in this process. Web companies have long recognised that standards and recommendations, not proprietary solutions, are what the development community wants to see and the key to owning the standard is to be active in its development.

In its current form, RealNetworks is the dominant player in SMIL, as four of the 14 editors of the draft are on the RealNetworks payroll. RealNetworks' G2 Player is the only commercial media streaming application to offer support for SMIL, although Macromedia has developed a G2 plug-in for its Dreamweaver product, which will allow support for SMIL.

Like XML, SMIL doesn't get down to data formats such as AVI or MOV, but plays the role of media choreographer,

defining how, where and when multimedia elements should appear. It also allows an author to synchronise audio and video with an event stream that can manipulate other layout elements. For example, authors can indicate where a clip should begin playing and where it should stop, where it should appear in the layout, and whether it should be launched in a separate window or just replace the current window. And significantly, multimedia objects can be played sequentially or concurrently.

The example in figure 1 is SMIL markup for a short presentation of several images from the town of Cherbourg, France, accompanied by a soundtrack. It makes use of a small Java applet called Soja to view the files and is a reasonable indication of the kind of things that are possible.

A quick look at these tags gives you an idea about the structure of SMIL.

```
<REGION ID="pic_quai" WIDTH="100"
HEIGHT="48" LEFT="26" TOP="14" />
```

In the line above, the region `pic_quai` is a variable defined by its size (height and width) and its location (left and top).

```
<IMG SRC="media/quai.jpg"
REGION="pic_quai" BEGIN="1.2s"/>
```

In this line, the source image (the JPEG file, `quai.jpg`) is to be displayed in the region defined above (`pic_quai`) but a delay is specified (1.2 seconds) before it should be displayed. This is the first of the three photographs shown in the screenshot below. In this case, no duration is defined implying it should remain on the screen.

```
<IMG SRC="media/abaye.jpg"
REGION="pic_abaye" BEGIN="1.6s" />
```

In this line, the same format occurs but the second image is delayed by 1.6 seconds. The final image is delayed by two seconds.

Clearly, this is a makeshift, automatic slide presentation where images are presented sequentially with music and additional text.

When the applet is run, it concludes as shown below.



Figure 1

```
<SMIL>
<HEAD>
<LAYOUT>
  <ROOT-LAYOUT WIDTH="431"
HEIGHT="334" BACKGROUND-
COLOR="#000066" />
  <REGION ID="bg_region"
WIDTH="431" HEIGHT="334"
LEFT="0" TOP="0" BACKGROUND-
COLOR="#000066" />
  <REGION ID="pic_quai"
WIDTH="100" HEIGHT="48"
LEFT="26" TOP="14" />
  <REGION ID="pic_abaye"
WIDTH="100" HEIGHT="68"
LEFT="26" TOP="62" />
  <REGION ID="pic_theatre"
WIDTH="100" HEIGHT="67"
LEFT="26" TOP="130" />
  <REGION ID="txt_courtesy"
WIDTH="220" HEIGHT="48"
LEFT="126" TOP="14" />
  <REGION ID="pic_map"
WIDTH="100" HEIGHT="101"
LEFT="250" TOP="180"
BACKGROUND-COLOR="#1699DA" />
  <REGION ID="txt_thanks"
WIDTH="180" HEIGHT="60"
LEFT="80" TOP="220"
BACKGROUND-COLOR="#1699DA" />
</LAYOUT>
</HEAD>
<BODY>
  <!-- SMIL in SMIL with SOJA -->
  <REF SRC="cherbourg.smil"
REGION="bg_region"
DUR="8.159s" />
  <PAR DUR="3">
    <IMG SRC="media/fond.gif"
REGION="bg_region" />
    <IMG SRC="media/quai.jpg"
REGION="pic_quai" BEGIN="1.2s"
FIT="slice" />
    <IMG SRC="media/abaye.jpg"
REGION="pic_abaye"
BEGIN="1.6s" />
    <IMG SRC="media/theatre.jpg"
REGION="pic_theatre"
BEGIN="2s" />
    <A HREF="http://www
.ville-cherbourg.fr/"
SHOW="cherbourg">
      <TEXT SRC="media/
courtesy.txt"
REGION="txt_courtesy"
BEGIN="2.5s" />
    </a>
    <IMG SRC="media/map.gif"
region="pic_map" />
    <text src="media/thanks.txt"
region="txt_thanks"
begin="10s" />
  </par>
</body>
</smil>
```

BizTalk

XML's real power will come from the money end of the Web. Ecommerce is what everyone is waiting for or has already waded into making mistakes. But in the commercial domain it is not innovation or technical superiority that is craved, but stability. Since XML is really a subset of its longstanding grandparent SGML, a bona fide ISO standard, it represents stability and longevity by default.

Perhaps the most dominant XML implementation to emerge from the ecommerce camp comes from Microsoft. Although started by Microsoft, BizTalk is (at least ostensibly) an independent community supported by vendors such as SAP and CommerceOne, and heavy-weight users such as Boeing and BP.

MicroGram Computers

VGA to Video Converter

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Serial and TCP/IP Ethernet LAN terminals.		
Cat. 1026	Serial Terminal 115.2Kbps	\$469
Cat. 1133	Serial Terminal 460Kbps	\$489
Cat. 1104	TCP/IP Ethernet LAN Terminal	\$499
Cat. 1134	TCP/IP Ethernet LAN Terminal with LPD	\$519

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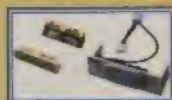
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Cat. 6614	Mobile Rack HDD Frame Kit IDE Hot Swap	\$159
Cat. 6615	Mobile Rack HDD Frame Kit IDE UATA 66	\$89
Cat. 6612	Mobile Rack HDD Frame Kit SCSI	\$79
Cat. 6613	Mobile Rack HDD Frame Kit SCSI Wide	\$129

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Figure 2

```

<BIZTALK XMLNS="urn:schemas-
biztalk-org/biztalk-
0.81.xml">
  <ROUTE>
    <FROM LOCATIONID="11111111"
LOCATIONIONTYPE="DUNS" PROCESS=""
ROUTE="" HANDLE="45"/>
    <TO LOCATIONID="22222222"
LOCATIONIONTYPE="DUNS" PROCESS=""
ROUTE="" HANDLE="93"/>
  </ROUTE>
  <BODY>
    <PO XMLNS="urn:schemas-
biztalk-org:fabrikam-com/
PurchaseOrder">
      Purchase order body
document in XML data here
    </PO>
  </BODY>
</BIZTALK>

```

BizTalk is run like a developers club, complete with its own 11-page philosophy that is reminiscent of open source. According to the BizTalk philosophy, current methods of application integration (app glue) are clumsy, and the cost and complexity of integrating back-office systems such as Enterprise Resource Planning and inventory management places a strain on most companies. As ecommerce demands greater application integration between multiple trading partners at various levels, BizTalk's XML-based architecture may well be a practical solution. However, this relies on enough of those trading partners agreeing to adopt it.

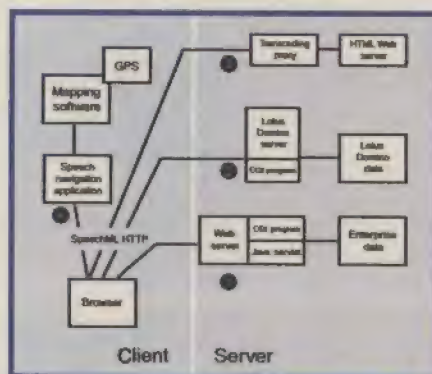
BizTalk is defined by a set of guidelines under the trademark BizTalk Framework, and at its core is the BizTalk Server. This is an application layer service, providing storage and manipulation of native XML data; querying capability on large sets of XML-based components; integration of disparate data sources into XML databases; execution of Document Object Model (DOM) applications using XML data types; and a standard interface to Web development languages such as JavaScript, VBScript and Java.

In the above example, a company called Fabrikam wishes to send a purchase order to a supplier. Fabrikam's unique company identifier is '11111111'. Its supplier's identifier is '22222222'. These identifiers are used by the BizTalk Framework infrastructure for routing and handling messages. The BizTalk Framework tags would look something like those shown in figure 2.

SpeechML

Earlier this year, IBM's alphaWorks Laboratory announced SpeechML, an XML DTD for conversational applications (those that interact with the user through spoken input and output). For example, conversational access may be enabled between a car, telephone, PDA or desktop PC, and information sources on the Net. Potentially, applications could include the same range of services and information now available visually through HTML.

The diagram below illustrates a generic speech markup application taken from IBM's own SpeechML demo. This can be downloaded from the alphaWorks site at <http://www.alphaworks.ibm.com/tech/sml/>, but it's not much use unless you have IBM's ViaVoice software running. On the left is a client device (car or PC, for example) where a conversational browser is running. On the right are three types of services running on three different servers. With some imagination, you could envisage that the servers are connected to the client by the Internet and are using a speech markup language to communicate with the client. Also shown is an application running locally on the client device using the same speech markup language to communicate with the browser.



Let's take a closer look. The example on the right is a food ordering system, which could be used in a restaurant or a McDonald's drivethrough. If you have ViaVoice running and download the Java servlet McServlet, this example will actually run on a standard late-model (XML-compliant) browser. The bold text is spoken.

It's a little Orwellian without please and thank yous, but it is a genuinely practical example of the technology. Of course it's only markup and doesn't help with the hard work of actually generating and interpreting

the text. Like all XML applications, SpeechML only helps at the level of orchestration. Further technology is required to generate and interpret the speech.

In this case, the technology of choice is the Java Speech Markup Language (JSML) developed by Sun Microsystems in collaboration with Apple, AT&T, Dragon Systems (which makes ViaVoice's main competitor, Naturally Speaking) IBM, Novell, Philips and Texas Instruments. At the time of writing, JSML and its companion technology, Java Speech Grammar Format (JSGF), were only in beta stage. For more information try <http://java.sun.com/products/javamedia/speech/>.

The fact that IBM is a vast company with many departments in many countries around the world may account for a strange anomaly. Concurrent with its

SpeechML

Computer

```

<FORM ACTION="http://
localhost:8080/servlet/
McServlet/">
  Please place your order.
  <FIELD NAME="sandwich"
RULE="mcgrammar.sandwich">
    Sandwich is?

```

User

Sandwich is chicken sandwich

Computer

```

<FIELD NAME="drink"
RULE="mcgrammar.drink">
  Drink is?
</FIELD>
</FORM>

```

User

Drink is Coke

Computer

```

<BODY>
  Your order of one chicken
sandwich and one Coke will be
ready when you arrive in five
minutes. The total cost is
$5.75. Please go to the
nearest Cyber Food Restaurant
located at 100 Maple Street.
</BODY>

```




MAG *nificent*

"JAG" control is the revolutionary new rotary control with the circular patterned OSD menus.

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SpeechML development, IBM is working with Lucent, Motorola and AT&T on another DTD called VoiceXML. Like BizTalk, but unlike SpeechML, VoiceXML is presented as a developer's organisation that combines the expertise of the different companies involved. According to the VoiceXML Forum, "IBM's Speech Markup Language technology gives the Forum and its specification additional technical strength and the benefit of IBM's experience in this area." These competing projects are typical of the way that many of the major IT companies are hedging their bets on XML applications.

SVG

The problem with all three current Web image formats (GIF, JPEG and PNG) is they are not scalable. They are bitmapped (raster) image formats and cannot be increased in size without a loss of quality. Vector-based file formats such as Adobe's Encapsulated PostScript format (EPS), on the other hand, can be scaled without loss, but file sizes are typically large and it's not suited to the Web as we currently know it. The only other options for vector Web images are proprietary formats such as Flash and QuickTime.

Scalable Vector Graphics (SVG) is the XML solution to graphics on the Web. It allows graphical objects to be grouped, styled, transformed and composited into previously rendered objects and boasts a swag of other features like nested transformations, clipping paths, alpha masks, filter effects, kerning, template objects, animation capability and, of course, extensibility. Since it's XML, it sits comfortably with other Web standards such as Cascading Style Sheets (CSS) and makes use of the CSS2 method of intelligent font matching and font synthesis. It is also compliant with the W3C DOM.

SVG could really make a difference. Being text-based, it offers reduced download times, allows search engines to index graphics and allows users to search for text within them. So, for example, you could search for a suburb or street name on a map. Map rendering could, in fact, be one of the most powerful uses.

In order to zoom in on a location on a Web-delivered map, a new image is sent from the server, which takes time and is inefficient. If the map was in SVG, the user could zoom in and out or pan across without asking the server for new data. SVG also offers high-resolution printing. That alone could totally change Web imaging, as the gulf between offset-

printable graphics and Web graphics is huge using current formats.

SVG contains six predefined objects: rectangles, circles, ellipses, polylines, polygons and lines. To create an image other than those basic shapes, you use the <PATH> element, which functions like freehand drawing. You can then add other images or text using the <TEXT> element. The example in Figure 3, taken from the SVG W3C working draft, will draw a blue circle with a red outline. The usual text string 'Hello World' will appear inside the circle.

This won't work on current model browsers, but you can experiment with SVG using some freely available tools. IBM's prototype Java-based viewer is available from the alphaWorks site at <http://www.alphaworks.ibm.com/>. Alternatively, the CSIRO has developed an SVG viewer, available from <http://sis.cmis.csiro.au/svg/>. In both cases, you'll need to download the Java 2 package and IBM's XML Parser for Java (XML4J) unless you already have them installed. The CSIRO site also has some impressive samples of what can be achieved using SVG in a browser-friendly format as shown below.



If you want to try your hand at creating your own SVG files, the excellent shareware Mayura Draw (formerly PageDraw) has a 'save as SVG' option in its latest beta release 3.6, available from <http://www.mayura.com/>. Adobe also has plans to include SVG in future versions of Photoshop, Illustrator and GoLive. It has also pledged a browser plug-in for Netscape Navigator and Internet Explorer browsers as well as a 'microviewer' for clients such as laptops and PDAs.

Other XML applications

The applications described above are just a few of what's currently available and more are appearing all the time. Novell has developed its own ecommerce solution compatible with its Novell Directory Services (NDS) called DirML; Vignette

Figure 3

```
<?XML VERSION="1.0"?>
<!DOCTYPE SVG PUBLIC "-//W3C//DTD SVG July 1999//EN"
  "http://www.w3.org/Graphics/SVG/svg-19990706.dtd">
<SVG WIDTH="4in"
  HEIGHT="3in">
  <DESC>This is a blue circle
  with a red outline
  </DESC>
  <G>
    <CIRCLE STYLE="fill: blue;
    stroke: red" CX="200"
    CY="200" R="100"/>
    <TEXT X=".5in" Y="2in">Hello
    World</TEXT>
  </G>
</SVG>
```

Corporation has joined with Adobe, Microsoft, CNet, Sun and others to develop the Internet Content Exchange (ICE) to enable syndicated publishing networks; and there are already dozens, if not hundreds, of specialist applications like MusicML (see our Web-only sidebar, 'MusicML: Markup for musicians', at <http://apcmag.com/features/9912/xml>), MathsML and aecXML (for architecture, engineering and construction). Many organisations are realising that there is no reason why they can't produce their own DTDs for their own purposes. It's quite possible, for example, to establish one DTD to interface with clients and another for back-end systems.

The future

XML has thankfully been fairly static since an official W3C recommendation was made in February 1998, and there has been little agitation for change. This is good news for developers and a positive sign for the future of the language, but XML is not in itself the final solution to data processing. According to Nick Carr, CEO of Sydney-based SGML consultancy Allette Systems, "It's all about syntax over semantics: XML means everyone knows how to process the data but the semantics of information are as dissonant as they've always been. We now have a common language to interchange data but we still don't know what to do with it."

Craig Kirkwood is the manager of the XML/SGML Asia Pacific conference and a senior technical writer at IBM.

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LIKE SANS THROUGH



THE HOUR GLASS

Storage Area Networks (SANs) promise continuous access to data, centralised management and the flexible provision of storage for enterprise-scale information systems. But despite emerging open standards, vendor/SAN lock-ins appear inevitable for some time to come. **Stephen Withers** explains.

Although SANs has been one of 1999's buzzwords, it is much more than a marketing catchcry. Rather, it represents a major change in the way shared storage devices are being connected to the rest of an IT system.

SANs are essentially high-speed, special-purpose networks (or subnetworks) that interconnect different data storage devices with associated data servers on behalf of a larger network of users. They are typically a part of the overall computing resources of a networked enterprise, supporting disk mirroring, backup and restoration; data archiving and retrieval; data migration

between storage devices; and data sharing among different servers in a network.

The SAN acronym is actually somewhat forced. While the 'A' in LAN, MAN and WAN all refer to geographical areas, it refers to a functional or logical area in SAN.

The SAN concept is best understood by first considering the evolution of methods used to attach storage devices to computers. The simplest case is local storage, in which the storage device is attached directly to the computer. This method yields maximum performance from the particular subsystems used because the device is not being shared. Any bottlenecks can be attributed

to the transfer rate of the disk or other device, the controller, the bus speed of the computer or similar things. The inability to share the data is the major disadvantage when using this type of solution.

In the case of local storage it is important that an appropriate backup regime is implemented. Expanding disk capacity is fairly easy — just install another disk on the IDE or SCSI chain. If a drive has to be replaced, it is necessary to back up all the data, install the new drive, reload the operating system and software, and then restore the backed-up data. This process impacts only on that computer's user.

Server and network storage

When a storage device is directly attached to a computer that acts as a server, it is referred to as a server storage device. Computers on the same network can make file read or write requests to the server, and information can be shared. Network bandwidth may cause a bottleneck, since high-performance disk drives have transfer rates measured in tens of megabytes per second (Mbps). However, careful network design and the selection of faster networking technologies can help you overcome this problem.

Backup can be centralised, which means it is more likely to be done regularly. Economies of scale is a factor here — the price per unit of storage falls as capacity increases. In other words, while you may need to fit an 8G drive in a standalone PC, it is quite possible to support 10 similar users with less than 80G of server space due to the presence of shared files.

Increasing the amount of space on a server is theoretically the same as upgrading a PC, but downtime affects all users and must often be scheduled for evenings or weekends. This is a particular problem in a continuous operating environment, and may involve commissioning a new, higher-specification server and switching users to it instead of upgrading the old one.

Network-attached storage essentially puts storage devices on the LAN where they can be accessed by one or more servers. The main problem with this approach is that it increases the amount of network traffic (as the data flows from the storage device to the server and then from the server to the PC along the same cable). Separate cable segments can be used to overcome this.

SAN storage

The relationship of a SAN storage device to a server is similar to the relationship between an individual PC and the server. Indeed, one vendor (Gadzoox) refers to SAN as 'the network behind the server'. Essentially, SANs provide a second, separate, and high-performance network to connect storage devices and servers.

This approach has several advantages over server-attached storage. For starters, the advantages of economies of scale are further increased, and apart from the advantages of even larger drives, it's possible to aggregate the headroom on several servers. Instead of allowing, say, 10G of space on each of 10 servers, you could buy 40G of spare

capacity now, and purchase another drive later. This approach reduces capital costs and makes it easier to take advantage of falling prices as the technology continues to improve. Additionally, it is not necessary for the servers to be homogenous; a SAN can service multiple hardware and software platforms.

Because servers now deal with logical devices rather than physical drives, the amount of disk space available to a server can be increased while it is running, rather than having to take the server down as is the case with physical drives. This is one of the key ideas of Hewlett-Packard's 'storage grid' concept (other vendors have similar ideas). Just as you can draw power from a wall socket as and when you need it, storage should be on tap without the complexity and interruption to service when installing new hardware.

The use of SANs means that storage management can be separated from service management. For example, an email administrator can concentrate on providing email services to users rather than worrying whether any particular server is running out of disk space. The amount of space used is still a consideration (does the business benefit gained from holding all that data exceed the cost of storing it?), but the threat of a service interruption caused by a full disk practically disappears. A similar situation applies to the administrators of an organisation's Web site, accounting system, production system and so on. The nature of SANs also opens the possibility of outsourcing an organisation's storage requirements, even if the rest of the IT operation is run internally.

Storage management

In any case, storage management is a task in itself as the amount of data stored within organisations continues to grow. In addition to trying to provide good customer service, efforts to understand customers mean that what once would have been considered out-of-date information is now kept online in the hope of identifying some characteristic or pattern that can be exploited.

Storage vendor EMC's president and CEO Michael Ruetters has been quoted as saying, "Every time someone goes on the Internet, they leave fingerprints, and somebody's collecting all those fingerprints."

Companies such as Amazon.com are taking this to a more sophisticated level based on more — a lot more — data. And all this data needs to be stored in the most efficient manner possible.

Forrester Research recently found that while the storage requirements of traditional businesses doubles every year, over one-third of retailers doing business over the Web expect a ten-fold increase in capacity in just two years. So storage is big business, and SANs are shaping up to take a big chunk of it. Research company IDC predicts a \$US6 billion SAN market by 2001, rising to nearly \$US17 billion (80% of the total storage market) by 2003.

SANs increase the complexity of an IT system, but paradoxically this can also increase its reliability. While complexity may increase the capital cost, improved reliability and manageability can reduce the total cost of ownership, particularly in environments where high availability is essential. Some of these factors are particularly pertinent to data backup.

The marketplace

The SAN marketplace resembles a collection of jigsaws, each with pieces missing. Vendors look to various partners (often small, specialist companies offering one particular product such as Fibre Channel switches) to provide the missing pieces, so there is a degree of interchangeability. An example of such specialist companies is switch-maker Brocade.

As yet, interoperability is limited, and will remain so until relevant standards emerge. Various vendors are doing their own testing, providing buyers with particular combinations of products that work together. EMC has a petabyte (approximately 1,000 terabytes) of storage dedicated to its own interoperability-

testing efforts. Hewlett-Packard offers a 'Tachyon Tested' logo for products that have passed interoperability testing with its Tachyon PCI Fibre Channel host adaptors.

Despite the emerging standards, vendor/SAN lock-ins are inevitable for a while, according to Gartner Group analyst Nick Allen. Gartner predicts total interoperability will be limited to vendor partnerships until at least 2005.

A selection of companies active in the SAN arena are discussed in 'Some SAN vendors' on page 142. This overview should provide an idea of the importance of interoperability, standards and partnerships issues in a burgeoning field where it is literally impossible to dominate.

Some SAN vendors

Compaq

Thanks to its acquisition of Digital, Compaq is perhaps the closest to having its own complete SAN product line — from cables to servers to services. Between them, Compaq and Digital shipped more terabytes of storage in 1998 than any other vendor. As an example of its SAN activities, Compaq provides Fibre Channel support for some of its storage arrays, and OEM switches and software to replicate data to remote sites at 100Mbps.

EMC

While EMC focuses on the 20% of companies that store 80% of the data, according to president and CEO Michael Ruettggers, that doesn't only include the world's largest enterprises. EMC is well aware that Internet-based companies have storage requirements much larger than their size on other measures would suggest. These include application service providers, which EMC views as a virtual distribution channel in the sense that they buy EMC systems and then sell storage on those systems to smaller companies.

EMC was a major player in the high end of the SAN market before it purchased Data General and its CLARiiON products to obtain an instant mid-range product line. EMC products already included storage arrays, switch and management software, and the company also offered professional services to companies interested in implementing SANs.

Companies such as Unisys and Dell have been selling CLARiiON products; conversely, CLARiiON systems incorporate components from other vendors, such as Emulex host adaptors, Legato backup software and StorageTek tape libraries.

Emulex

Known also for its printer servers and other LAN products, Emulex has a Fibre Channel range it sells directly, through distributors and to OEMs, including host adaptors, an adaptor for direct attach storage, and a managed digital retiming hub.

Exabyte

As you know, backup is important if you are going to store huge amounts of data in one place. Exabyte's NetStorM (Network

Storage Management) architecture includes Arrowhead tape libraries, NetStorM management software, and Fibre Channel components and backup software from its partners. Unlike several companies in the SAN market, Exabyte targets medium-sized companies.

Hewlett-Packard

Hewlett-Packard offers disk arrays, Fibre Channel switches, management software, and consulting and support services. The company previously sold EMC storage systems, but that arrangement ended mid-year when Hewlett-Packard switched to an OEM arrangement with HDS.

Hitachi Data Systems

Hitachi Data Systems (HDS) operates in coalition with several other vendors, including Ancor (switches), Emulex (host adaptors) and Gadzoox (hubs and software), with HDS providing its own Freedom Storage systems in various capacities and delivering planning and implementation services. HDS recently changed its strategy from direct sales only to include a distribution channel through resellers and value-added distributors. The aim is to add the NT and Unix markets to its traditional mainframe customers.

IBM

IBM sells a mixture of its own products and those from other companies.

The Enterprise System Server (codenamed Shark) brings mainframe technologies to the Windows NT and Unix world with features such as parallel access, which means that when multiple users request the same data, they don't have to wait for their turn to be served. The product has a disk capacity of 420G to 11.2T. Previously, IBM has sold Storage Technology products and has taken around 22% of the global open systems storage market, compared with EMC's 35%. IBM recently announced plans to purchase Mylex, a manufacturer of controllers and adaptors used in storage systems.

Pathlight Technology

Included here as an example of a specialised product from a small company, Pathlight's

SAN Router provides a way to integrate Fibre Channel hosts and SCSI devices without the problems associated with Fibre Channel Arbitrated Loop products, such as inappropriate streams of LIPs (Loop Initialisation Primitives, which are involved in the process of selecting addresses for each device) and device reset issues. SAN Router can be configured with two single-ended or differential SCSI ports and one Fibre Channel port, and is available in rackmount or desktop versions. Management software is included. SAN Router is incorporated in IBM's SAN Data Gateway product.

StorageTek

One of the leading suppliers of disk arrays as well as tape drives and libraries, StorageTek bundles management software from a variety of sources including Legato, Veritas and Computer Associates.

TruSAN Networks

TrueSAN claims its 6000FC series storage system can provide 200Mbps of useable bandwidth over one large segment.

Veritas

Veritas is a major supplier of storage management software. Earlier this year, Veritas merged with the storage management group of Seagate Software in a \$US2.7 billion deal. Veritas was strong in the Unix market, Seagate in Windows NT. The company is progressively adding to its current support for SAN-related features in its disk management, backup, HSM (hierarchical storage management), clustering, storage resource management and application integrated storage management products. (That last category integrates various Veritas products to assist in the management of specific applications such as Oracle, Sybase and SAP.)

Vixel

Vixel's range of Fibre Channel products includes managed and unmanaged hubs, a switch, transceivers and management software. The company's seven-port hub is being sold through IBM's sales and distribution channels as an IBM-branded product.

One of the problems with backing up servers across a LAN is that it is easy to saturate the network. It is possible to back up every server locally, but it distributes operator intervention. While it is important to manage a network-wide backup, experience shows that people aren't as diligent as they should be when their only involvement in the administration of the network is to change a cartridge when they arrive at the office every morning. When they are absent from the office an appointed deputy is even more likely to forget. SANs provide much higher bandwidth and as a result a SAN-based centralised backup is unlikely to cause saturation.

Further, redundant storage means full availability during backup; this works by using drive mirroring in the storage units. When it is time to do a backup, one drive is logically disconnected from its twin. The disconnected drive is backed up, while the other continues to service the servers. When the backup is complete, the drive is reconnected and automatically re-synchronised with its twin. This approach is very useful for systems that must operate around the clock, or for those where the volume of data has grown to the point where the time needed to do a backup exceeds the available downtime.

The need for high availability implies the use of RAID (Redundant Array of Independent [Inexpensive] Disks), but it is not mandatory. JBOD (Just a Bunch Of Disks) is an alternative for data that is frequently used (and therefore must be kept online) but not mission critical, such as

local news servers' files. Other devices such as optical jukeboxes can also be attached to a SAN.

The network technologies used in SANs means that effectiveness is not limited to a single building. In other words, a single device farm could provide storage for servers in multiple premises, or devices could be distributed to provide data security in case of a major fire or other interruption to operations at an individual site.

IDC predicts a \$US6 billion SAN market by 2001, rising to nearly \$US17 billion by 2003.

Reliability and data recovery are always important, but the trend towards end-to-end ebusiness means that data increasingly exists only within computer systems — it cannot be recaptured from paper systems such as timesheets, order forms or shipping notes. In such an environment, the purchase of a more expensive system that can deliver on promises of higher reliability may be a prudent move.

SAN infrastructure

Fibre Channel is the most widely used network technology within SANs, providing a 120Mbps interface that can interconnect hundreds of devices over distances up to 10km — a far cry from SCSI's eight devices and a few metres. An increase in bandwidth to 480Mbps, a four-fold increase in throughput, will happen soon.

Disk arrays and tape libraries are connected to servers via hubs or switches. If devices are connected via a hub, the bandwidth must be shared. When a switch is used instead, the full 120Mbps bandwidth is available to each communicating pair of devices (much as hubs and switches can be used to build an Ethernet). A switched fabric also provides higher availability, as long as there is more than one route between each server and storage device.

One of the problems with Fibre Channel is the lack of a common management information base that allows one manufacturer's software to manage another's hardware. However, this situation is set to improve — the Internet Engineering Task Force is expected to ratify a proposal from the FibreAlliance consortium before the end of this year. Also, broader interoperability and standardisation issues are being addressed by the Storage Networking Industry Association.

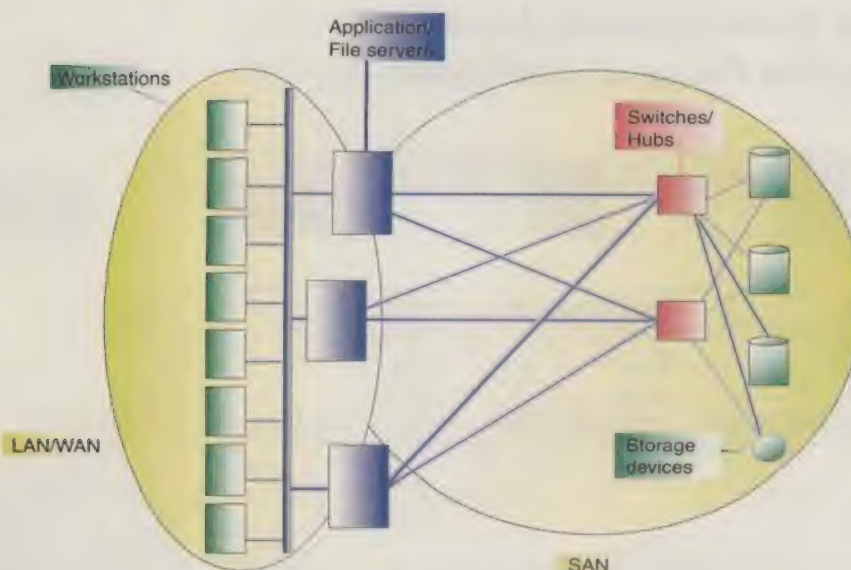
While Fibre Channel predominates, it is not the only technology that can be used in a SAN. ATM (Asynchronous Transfer Mode) can also be applied. ATM offers a variety of speeds from 34Mbps to 2.4Gbps (with 10Gbps being planned) over fibre-optic and, at lower speeds, twisted pair cables. Its main advantage over Fibre Channel is that it has no distance limitation — a connection can be across a room using a simple cable connection or across the world via a telco's ATM service.

Its main proponent in the SAN arena is UK-based Storage Area Networks' DiskLink product. DiskLink allows connections between SCSI devices and hosts over ATM. Multiple hosts can be interconnected with multiple storage devices.

For enterprise-scale information systems, SANs promise continuous access to data (regardless of individual failures), centralised management and the flexible provision of storage. As the costs of downtime rise, the investment necessary to implement SANs will be increasingly justifiable even at smaller sites — especially once standardisation reduces those implementation costs.

It's important to remember that SANs by themselves do not automatically provide all the benefits discussed, such as backups that do not interrupt the normal operation of application servers. Instead, it is an enabling technology for the architectures and products that do deliver them. ■

A basic SAN architecture



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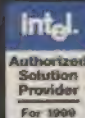
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Workshop

147 WORKSHOP/DECEMBER 1999

CONTENTS

Welcome to Workshop. This section is dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating system-specific columns and in-depth programming tutorials.

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at <http://apcmag.com/>. You can join one of our online discussion forums to discuss technical issues or to voice your opinion on any related topic.

Workshop is a reader-input section. Please email your ideas, comments or criticisms to workshop@acp.com.au, or send snail mail to APC Workshop, PO Box 4088, Sydney NSW 1028.

A full archive of Workshop articles can be found online at <http://apcmag.com/workshop/>.

Andrew Colley, Workshop coordinator

Tech Talk

Technobabble discusses multiprocessing and its significance for common computing tasks in the future, and **Step by Step** explains how multiple PCs can share an Internet connection.

Operating Systems

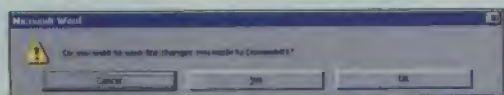
The **Windows 98** column discusses recent advances in Windows 98's multimedia capabilities, while **OS/2** teaches you how to jazz up your desktop. The **Mac OS** column gives you a few tips and tricks to help you make the most of some newer disk formats and the **Linux** column teaches you how to duplicate a Linux installation.

Programming

The **Simple C++** column explains how to use classes in object-orientated programming, and **Java** tells you how to use checkboxes and radio buttons in your applets.

Bug of the Month

This month's bug comes from Marlene Jerlitschka. Marlene had something of a mishap while installing Service Release 1 for Office 97. When she tries to quit a program, Marlene now gets this:



It turns out that "Cancel" means save; "Yes" means No; and "OK" will cancel the request. And they say that computers can be confusing!

Marlene also asked, "Do you have a suggestion for how I can fix it?"

There is one tried and trusted DOS command you should recognise:

FORMAT C:

But I wouldn't recommend using it unless you don't mind wiping your hard drive and starting again.

Win! Win! Win!

Workshop is always on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, features that function poorly, or things that crash a particular application. Anything and everything buggy deserves mention.

Send us your favourite bug via email to bugs@acp.com.au or snail mail to APC Bug of the Month, PO Box 4088, Sydney NSW 1028, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions to trigger a bug in an application, as appropriate for your entry.

The winner's name, along with details of the bug, will appear in the Bug of the Month column in the February edition of APC. So start hunting!
Michael Smith

Pocketbooks

The first release of the *Y2K Emergency Pocketbook* was a sell-out, but this essential toolkit, designed to help home and small business users combat the millennium bug, is available once again. Inside you'll find an in-depth guide to contingency planning, plus a step-by-step rundown of what to do if your system fails in January.

It is not too late to act. Buy the *Y2K Emergency Pocketbook* now and keep it handy when the clock strikes midnight.



If there is a specific topic you would like to see covered in the pocketbook format, send your suggestions to pocketbooks@acp.com.au.

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Fancy writing for Workshop?

Each month, Workshop aims to bring APC readers detailed information on how to get the most out of their computing experience. We're constantly looking for new writers and suggestions on areas you want to see covered. If you're interested in writing for Workshop, please send a brief email outlining your areas of expertise, topics you'd be interested in writing about and samples of your writing to apc@acp.com.au.

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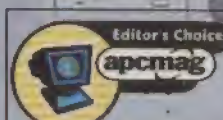
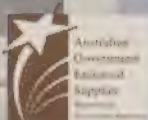
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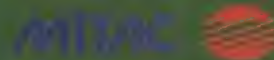


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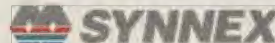
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Multiprocessing and geometry processing.
By Nathan Taylor

Technobabble

This month's column was meant to be a follow-up on programming and scripting. However, in light of the feedback we received on the 'Maximum speed' feature (see *APC* October, page 88) and this month's review of the Nvidia GeForce 256 (see *First Take*, page 40), we realised that multiprocessing and geometry processing, two important issues for future computing performance, were more topical issues.

Multiprocessing

Although the technology has been around for a few years, it's rare to find a multiprocessing system made by a major manufacturer. Computer companies have had little interest in pushing multiprocessing to the masses, limiting its application to workstation and server systems. This is in spite of the fact that the most common chipset sold today for consumer systems, the BX chipset, is inherently capable of supporting two processors. The big problem is the lack of support for the technology in the world's most used operating systems, Windows 95 and 98.

Windows 9x can only see one processor, no matter how many are present in the system. While it will run fine on a system with multiple processors, it will only use one. Windows NT and 2000 are another story, both have the ability to support two processors in the Workstation/Professional versions of the products, and four or more in the server versions. Linux can use multiple processors, though its support is fairly recent and somewhat patchy. BeOS can also support two processors in a system (although it is not thread-based like most OSes). Most versions of Unix can support multiprocessing, but MacOS only supports one processor at this stage.

Most multiprocessing systems are thread-based. What does this mean? In multitasking operating systems (most post-

DOS operating systems), many applications are designed to run simultaneously, each getting a timed slice of the CPU's power. In simplest terms, the operating system sees each application that is running as a single thread (unless it happens to be a multi-threaded application) and it assigns each one a chunk of CPU time.

On a normal symmetric multiprocessing system (which all currently are), the operating system simply divides these threads between processors and assigns new threads to the processor with the least current load. However, a single thread cannot be split across processors, so if you are only running a single threaded CPU-hungry application, then its thread cannot be split across processors, effectively wasting most of the processing power of CPUs not receiving that thread. (As a side note, an asymmetric multiprocessing system would not split threads evenly across CPUs, instead weighting threads towards one processor or another).

Only a few applications can actually split themselves into multiple threads. Quake 3 Arena, for instance, has one thread for graphics and another thread for the rest of its operations. Assuming the operating system splits them across the processors, it can actually make use of up to two processors, dividing the load across them. However, Quake 3 is the exception rather than the rule — no other major commercial games make use of multiple threads. Most desktop applications also only use a single thread, and thus can only be applied to one processor. Generally, only higher-end applications like CAD and database applications are designed to use multiple threads and therefore take best advantage of systems with more than one processor.

That doesn't mean that multiple processors are useless for everyday users. For one, if you have a tendency to open numerous applications at once, the operating system can assign different applications to different processors. If you open Word and Excel,

for instance, each could be assigned to different processors. There is also some advantage when you open up single applications, as system-level services at least (those operating system-level things that are constantly running in the background) can be run on a different processor to the application, thus freeing up processing power on the CPU with the application running on it. So even if you only use your system for things like games, multiprocessing can be of some use. You won't see a huge performance increase, but there will be some, depending on the operating system and the game in question.

Finally, and not to be underestimated, is that SMP systems can be a little more robust than single processor systems. If an application crashes and suddenly decides to suck up 100% of the CPU, you still have other CPUs to work with. It's hard to kill an application when you don't have CPU power, because you can't access the system to send a kill signal. Using a multiprocessing system, you may still be able to.

The most likely system configuration you'll come across (unless you are a server administrator or work on a workstation) is a dual processor system. All you need to get one of these is a dual-processor motherboard, which is readily available from manufacturers like Tyan and SuperMicro, however, you'll probably pay a few hundred dollars more. You should also make sure that your computer case is large enough, and well ventilated enough, to support the motherboard and processors.

It's not necessary to put two processors in immediately, as you can always leave a slot free for future upgrades, or for when the price of the processor comes down.

Of course, you also have to buy a new processor that is the same speed as your current one. There are two reasons for this: the motherboards have a single, universal clock speed setting mechanism, and the OSes partition tasks evenly between processors.

Getting a multiprocessor system is not a bad option, especially with Windows 2000 in the pipeline. Processor prices are dropping all the time, so it can be a pretty good way to give your system a boost without forking out for a replacement PC.

Geometry processing

When Nvidia launched the GeForce 256, there was a bit of a kaffuffle about the value of transform and lighting (T&L) capabilities in graphics chips. T&L, formerly only present in workstation-level graphics cards, is now an option for consumers.

So what does a card with hardware transform and lighting do? Simply put, it takes the processor-intensive part of 3D graphics production out of the hands of the CPU and puts it on a custom circuit.

We've talked about the graphics pipeline before, but let's recap quickly here. Broadly speaking, there are two main phases: geometry transform and lighting (T&L), and rendering.

The main CPU typically handles the T&L stage. It is the drawing of the wire frame impression of what is to appear onscreen, taking the absolute coordinates of the objects in the 3D space and applying them to the viewer's perspective. It also involves calculating lighting levels for the objects. This stage is very intensive, and is likely to take up the lion's share of a system's processing power.

The second phase, normally the domain of the graphics card, is the rendering of the image — in effect 'painting' the wire frame impression to make it look solid. The new T&L capable graphics cards can now perform both phases lifting those responsibilities from the CPU. Because it has circuits specifically built for geometry transformation, the new graphics card can generally do it much faster than a CPU.

A lot of people don't really understand the full benefits of geometry processing. For most people, the main appeal in the technology is not the raw speed it provides to games, but the ability to turn a system with a mediocre processor into a speed demon. It takes the host processor largely out of the equation when it comes to graphics processing, which allows even low-end systems to run some pretty

impressive graphics. That's not to say the host processor becomes irrelevant — game developers will surely find inventive ways to make use of it. With more CPU time to burn, developers can start work on improving physics modelling and artificial intelligence routines.

The bad news is that it will be several years before we see a great deal of advantages from transform and lighting acceleration. Very few games use APIs for their transformation engines. Most actually build their own geometry and lighting engines, using an API only for rendering purposes. This was fine when

ties of the API. OpenGL has a T&L component, and the recently released DirectX 7.0 also has T&L support — previous versions of DirectX do not, nor does Glide.

Just because a game supports OpenGL, doesn't mean it supports T&L automatically. The same can be said for DirectX 7; just because you're running it, doesn't mean it automatically uses the card's T&L engine. Both of these APIs have geometry engines, but the developers do not necessarily have to use them; frequently they will only use the rendering part of the API. Quake 3, for instance, uses OpenGL from end to end, so it will be able to use T&L immediately. Unreal, on the other hand, uses only the rendering parts of the APIs it runs on, so will not take advantage of the new accelerators.

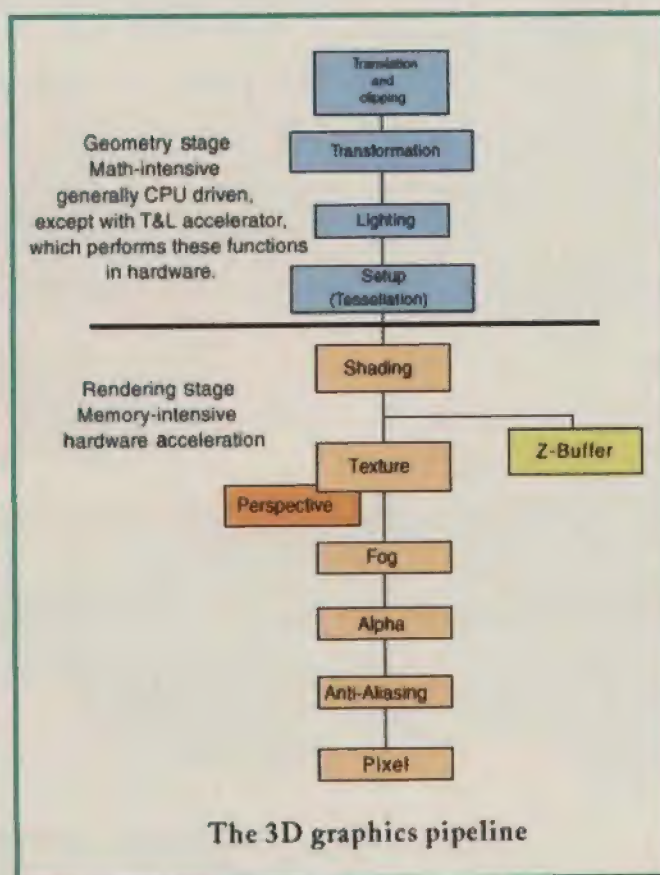
Then there's the fact that most games are built with the lowest common denominator in mind. The number of objects appearing in a scene in most games are designed around the limitations of CPU-based geometry, and won't even make a hardware solution twitch. Most detailed games measure their onscreen polygon counts in the ten thousands. The new geometry accelerators list their polygon throughput in the millions.

There's no doubt that having lots of polygons in a scene makes the image look much better. The sharp edges you see on many objects and characters can be smoothed over, and curves look more like, well, curves.

Some vendors like 3dfx are concentrating their efforts on producing parts with very high rendering speeds instead of integrating T&L. This is a simple

ploy; these cards will run existing games far better than cards with T&L engines that are unused by the games. Future games with higher polygon counts will run slower on these cards as they are limited by the host CPU when it comes to geometry, but it's almost certain that cards with high fill rates will win the benchmark and frame rate battles today.

Nathan Taylor can be contacted at ntaylor@acp.com.au. For a complete archive of APC Technobabble columns, see <http://www.apcmag.com/babble/>.



there were no video accelerators capable of taking advantage of T&L, and it even allowed game developers to easily port the application to different APIs as all they had to do was make a few changes to the way the data was sent to the rendering API. So a single application could support Glide, DirectX and OpenGL, depending on the user's preference and the card in use.

To make use of a card's T&L capabilities, the game or application must be written to take advantage of the T&L engines present within the APIs, rather than just using the rendering capabili-

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Sharing your Internet connection.

By Daniel Rutter

Step by Step

It is increasingly common for households and small businesses to have more than one PC. The most obvious way to connect multiple computers to the Internet would be to attach a modem to each PC. This isn't the best solution, however, because you would either need to install multiple phone lines (and, probably, get multiple Internet accounts) or take turns to dial up; both of which are expensive.

If the computers are networked they can quite easily share one Internet connection — if they aren't, the cost of networking them is considerably less than the cost of a modem for each PC. A single modem connection is sufficient for light Web use and email. If there are a lot of heavy Internet users or Internet game players, then a faster connection is necessary. Either way the connection can be shared.

There are two basic ways to share a Net connection: using a proxy server or Network Address Translation (NAT). Serious network-oriented operating systems like Linux can do bulletproof Internet sharing, but it's possible to achieve it on Windows as well, and you don't need to be a propper head to get results.

Internet sharing requires the use of TCP/IP protocol (Transmission Control Protocol/Internet Protocol — the protocol that the Internet is based on) across the network linking the PCs that will use the connection. On most small Windows networks, only those machines that have a modem and use dialup networking will require TCP/IP — in that case TCP/IP is the protocol operating over the dialup adaptor, and the network itself uses IPX/SPX or NetBEUI. It's easy to add TCP/IP. The installation guides that come with the more popular sharing systems and the basic Windows help system cover TCP/IP address setup adequately. TCP/IP won't interfere with the other protocols your network may be running.

Proxies

Most Internet users will be familiar with proxies already because many ISPs (Internet Service Providers) run one and either request or demand that all customers use it. Your ISP's proxy server sits between your client applications (for example your Web browser) and the servers on the Inter-

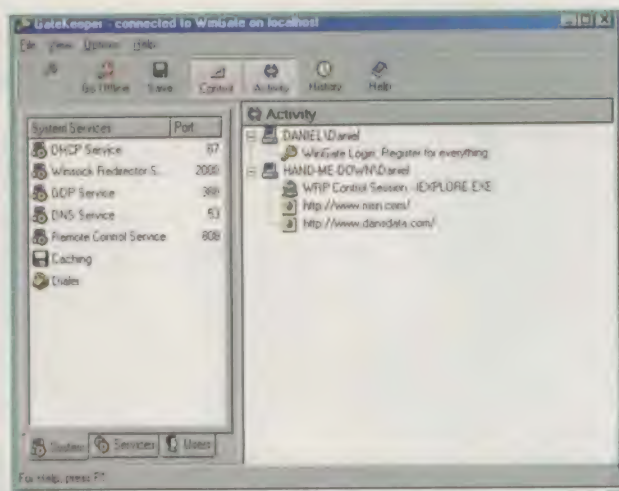
net from which you're requesting information. When you make a request it goes to the proxy server — the proxy server will only pass the request on if it has to. If it already has the data you want in its local cache, it can deliver it more quickly.

This improves performance in much the same way as your browser's cache, which is stored on your hard drive. You can retrieve data from your hard drive faster than you can download it via modem. Similarly, retrieving data from your local ISP is faster than getting it from a more distant server. An ISP's proxy caches everything that's been requested by all of your ISP's customers, so you can get data quicker the first time you request it, provided someone else has asked for it before.

Proxies can also do fancier tricks, like blocking banner ads or preventing access to particular sites. All of the basic Internet applications — HTTP, FTP, email, telnet and so on — will work fine through a correctly configured proxy, but it also lets you control which Internet services your clients can access.

ISP proxies have to be high performance systems, but you can run a bonsai version on any regular PC. If you want to use a proxy server to share your Internet connection you'll need to install the proxy software on the machine that is physically connecting the network to the Internet. As long as the proxy machine is on the same TCP/IP network as the rest of the computers, sharing the connection is easy. All you need to do is specify the proxy machine's address in the appropriate section of the Internet configuration of each machine that you want to use the connection — whenever the proxy machine is online, so are the others.

A proxy also acts as a 'firewall', giving you some network security. There's no way for requests from the outside to get to any local machines other than the proxy box, and you can specify which, if any, requests the proxy box will listen to.



WinGate lets you easily control and monitor the services used by clients

Possibly the most popular proxy server for the Windows platform is WinProxy. It is commercial software and there is a free evaluation version available that you can try for 30 days. It's got a friendly setup wizard, provides information about what you have to change on your client machines to make them work with the proxy, and lets you administer each client's access rights and services individually. For instance, you may want some clients to have HTTP access only, or just mail and FTP, or whatever combination you like.

This makes WinProxy a good choice for small business owners who want to prevent employees from accessing the Web, but still allow them to use email. WinProxy can also log each client's activity and restrict the time they can spend online — a handy feature for any parent.

NAT

Network Address Translation (NAT) is easier to use than proxy software; it provides automatic translation of incoming and outgoing data, and you don't have to fiddle with the clients as much to make them work with it. Like a proxy, a NAT setup runs on the computer (or other appliance) that physically connects the network to the Internet, but unlike a proxy, it does practically no processing of the data and does not store it locally.

This makes NATs more transparent than proxy servers, but they don't have



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the ability to cache pages or filter network traffic, which is necessary for ad filtering, for instance.

Possibly the most accessible NAT software available for Windows today is the Internet Connection Sharing (ICS) feature built into Windows 98 SE (Second Edition). Only the computer that is physically connected to the Internet needs to have Windows 98 SE installed; the other machines need only have TCP/IP installed.

If you're using a simple LAN, ICS is an excellent way to share an Internet connection. ICS includes a Dynamic Host Configuration Protocol (DHCP) server that automatically assigns IP addresses to all computers on the network. Provided you install TCP/IP, Windows ICS will work brilliantly.

If any of the machines on the network were previously set up to use a proxy server, you'll have to manually clear the proxy settings on each machine in order to use ICS. You'll probably run into difficulties with ICS if your network configuration changes. For instance, if you take the ICS server machine and temporarily plug it into a network that has its own DHCP server, the ICS DHCP server will detect that



there is another DHCP server in operation and turn itself off. Making ICS work again afterwards without reinstalling Windows is . . . well, it's a challenge we have yet to overcome. Microsoft's offline and online documentation for ICS is copious, but not necessarily helpful.

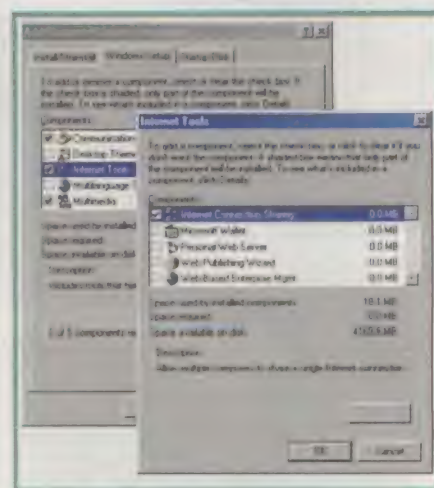
There are other cheap Windows NAT packages, such as the \$US25 shareware program NAT32. There is an evaluation version of NAT32; it's fully functional, but it will only allow you to use it for an hour at a time. There are two other popular Windows NATs: WinGate and SyGate. Both are more capable and less mystifying than the Microsoft option, and have downloadable evaluation versions. It's actually worth downloading SyGate for its documentation alone, as it explains the whole process a lot better than Microsoft's ICS documentation.

Gameplay

It's possible to play online games via a proxy or a NAT, and many games will work perfectly with the more popular sharing packages. If you do need to change things, you'll have to open specialist TCP or UDP (User Datagram Protocol, the simple protocol used by games like Quake) 'ports' that games frequently use for communication. The kind of port and its ID number depends on the game being played.

You should probably shelve any fantasies you may have about using a single-modem, shared connection to hold a Quake party, or for any other multi-player gaming scenario — it is not worth trying. A single player will easily consume all of the bandwidth that even the fastest modem can provide, and still not achieve smooth game play. A single modem simply can't provide decent game play for more than one person. If you're using a proxy, it's likely you'll see a further reduction in performance, because the proxy takes a significant amount of time to process the game data. NAT software is faster than a proxy, and generally doesn't add enough lag to worry about.

Less time-critical entertainment, such as real time strategy games, deals with restricted bandwidth better. Even then, if lots of units start fighting you're likely to find yourself with the same nasty lag and drop-out issues. Turn-based strategy



Internet Connection Sharing is a stock component of Windows 98 Second Edition

games, on the other hand, can work really well even over very slow connections.

Hardware or software?

You can get hardware devices that perform proxy or NAT functions. These devices can be an excellent solution for a small business. Plain models that support one or two modems cost much less than a new PC. They're even more reliable than a Linux box (and *much* more reliable than a Windows box), and are about as easy to set up as software-based solutions. A hardware device can be left to run continuously 24 hours a day, seven days a week in a cupboard somewhere with its modem. If you use a PC in a dual role as connection distributor and workhorse, it's very unlikely you'll be able to match the reliability of a dedicated hardware device.

Proxies v. NAT

Proxies allow you to have greater control over access privileges and allocation, but NATs are generally easier to set up and will better meet the needs of applications like network games. For a plug-and-go office solution, a stand-alone hardware proxy device is a good choice. For home networking, ICS works brilliantly. For a really industrial strength solution, a Linux box is the way to go. But you don't need much expertise to set up the simpler Internet sharing options, and the benefits are huge.

Daniel Rutter can be contacted at dan@dansdata.com. For a complete archive of APC Step by Step columns, see <http://apcmag.com/step/>.

Further reading and links online

WinProxy

<http://www.winproxy.com/>

NAT32

<http://www.nat32.com/>

SyGate

<http://www.sygate.com/>

WinGate

<http://www.wingate.com/>

The NAT Page

<http://www.uq.net.au/~zzdmacka/the-nat-page/>

Modem sharing information

<http://www.timhiggins.com/>

Cable modem sharing info

<http://www.cablemodeminfo.com/cablesharing.html>

AcerShare.jpg

This Acer Internet access sharer has two modem connections and retails for about \$425.

The latest advances in Microsoft's multimedia technology.

By Kieran McNamee

Windows 98

Windows 95 made a large contribution to advancing the multimedia capabilities of personal computing. Windows 98 continues this effort by enhancing already seen features and introducing new ones, including the latest Windows Media Player and its companion Windows Media Technologies 4.0.

The Windows 98 CD player hasn't changed. The latest DirectX APIs (Application Programming Interfaces) are supported and are easily upgraded using Windows Update. These APIs are very important for various forms of multimedia, especially gaming. The different components of DirectX, such as DirectDraw and DirectSound, interact with the running application and the operating system so you can get the most out of your system. Each version of DirectX improves on the last, so it is important to have the most recent files on your system. Installation of multimedia devices is of course easier in Windows 98 because it supports a greater variety of Plug and Play peripherals.

One of Windows 98's new multimedia features is WebTV, which allows you to view standard and interactive television broadcasts with a TV tuner card. Another brilliant addition is the ability to use multiple monitors.

Microsoft's new Windows Media Technologies has shaken the dominant Internet multimedia delivery formats and created conflict between Microsoft and RealNetworks.

The main component of Windows Media Technologies is the latest Windows Media

Player, and it is one of the biggest multimedia improvements in Windows 98. The original version that comes with Windows 98 is a step above anything Windows 95 had to offer, but the latest version of the Media Player will impress you even more.

At the time of writing, the most recent version of Windows Media Player was 6.4. Windows Media supports WAV and AVI formats along with a whole pile of others, such as MIDI, MPEG, MP3, MOV and AU.

Microsoft's new MSAudio format is challenging MP3 as the best digital audio format. The MSAudio format delivers near MP3 quality in a file about half the size. This means you are able to download songs twice as fast, and store twice as much music on your portable digital player.

Streaming media is another big improvement. The term streaming is used for audio and video files that play as they are being transmitted to the player. The main advantage of streaming media is that you don't have to wait to see or hear what you want.

Streaming media has been available on the Internet for some time, albeit in a low-quality form. The technology is yet to reach the stage where broadcast of full-screen TV shows and videos is possible, but it's getting close.

Streaming media has been the domain of RealNetworks' RealPlayer, but Microsoft's new Advanced Streaming Format (ASF) represents stiff competition for RealNetworks and its RealSystems G2 format. Many reports and tests seem to indicate that Microsoft's new format is substantially better.

The current problems with streaming media revolve around the Internet's delivery speed, packet loss during transmission, and the uncertainty of the recipients' acceptance speeds (for example,



cable modem users will receive better presentations than those using a 28.8Kbps modem).

Ensuring that playback is not interrupted by delays in the network is a difficult task, but one that Media Player achieves quite well. The technique used is called buffering and it involves collecting a small backlog of data before the file starts playing. If the data keeps flowing fast enough, playback remains continuous. This means you only have to wait the few seconds it takes to create this buffer before viewing the file, regardless of whether the file lasts 30 seconds or 30 minutes.

You can find some streaming audio and video content on the Internet in Microsoft's ASF, but the majority remains in RealAudio and RealVideo formats. You will still need RealPlayer G2 to play the latest RealSystem G2 files, so Microsoft hasn't managed to get a stranglehold on the market yet.

You can connect to Web radio stations with ease if Internet Explorer 5.0 is installed, and the output is impressive.

Media Player's streaming video capability also passes the test. The presentation



is very impressive; the audio and images flow smoothly and Media Player doesn't pause to rebuffer too frequently. A similar audio and image presentation viewed on RealPlayer did not produce the same quality as Windows Media Player.

The new Windows Media Player is able to produce high-quality streaming output because of the new codecs included in Windows Media Technologies 4.0. The word codec is derived from the words 'compressor' and 'decompressor'. If codecs were not used to reduce the size of multimedia files then it would be impossible to send them over the Internet. Codecs implement a compression algorithm to reduce the size of the media file. When a file is compressed, it loses some of its original data in order to reduce transit time. Content providers struggle to find a suitable trade-off between delivering high-quality content and achieving acceptable data compression rates. MP3, RealVideo and JPEG are examples of common codecs.

Windows Media Technologies 4.0 has three codecs that were designed for encoding music, video and voice content. These have the best quality, broadest frequency range and fastest encoding speed of any codecs available on the market today (in Microsoft's opinion anyway).

The first of the new codecs is Windows Media Audio. It can deliver near FM radio quality sound at 28.8Kbps and near CD quality at 64Kbps. Its frequency range is two to four times greater than that offered by other codecs, preserving more of the original signal to deliver better audio to listeners.

The second is a video codec, MPEG-4 v3, based on the MPEG-4 video-coding standard (Motion Picture Experts Group V4). It was designed to deal with high compression ratios for distribution of video over low bandwidth networks while still providing excellent quality at higher bit rates.

The third codec is called ACELP (Algebraic-Code-Excited Linear Prediction Vocoders). It was designed by Sipro Lab

Telecom for compressing the human voice to produce high-quality wide-band audio at very low bit rates. When these codecs come together, the result is a streamed content that can be delivered efficiently and with fairly good quality.

RealNetworks v. Microsoft

Considering all of Microsoft's competing technologies you would think that there would be some kind of unrest from the opposing camp at RealNetworks. There is.

The conflict started after Microsoft hired the National Software Testing Laboratories (NSTL) to evaluate Windows Media Technologies (MSAudio and ASF) and compare them to MP3 and RealSystem G2 formats. The tests returned a positive appraisal of the Windows Media Technologies formats.

After these test results were announced, RealNetworks responded by publishing new tests that said that RealSystem G2 and MP3 offered superior audio quality to the Windows Media formats. Microsoft responded with a press release claiming that RealNetworks' testing procedures were flawed and would produce inaccuracies.

If you want to have a look at all the bickering for yourself, go to the companies' Web sites. The results of the tests that the NSTL conducted for Microsoft can be found at <http://www.nstl.com/downloads/Final%20MSAudio%20Report.pdf>.

Hostility between these two industry leaders dates back as far as July last year. RealNetworks claimed that Microsoft had intentionally designed a version of Windows Media Player that would cause RealPlayer to malfunction if the two were simultaneously residing on a system. Despite the CEO of RealNetworks, Rob Glaser, testifying before the US Senate Judiciary Committee, it was found that RealPlayer G2 was the program with the fault. Microsoft sent a letter urging RealNetworks to focus on its customers rather than wasting everyone's time in court.

Since the release of Windows Media Technologies 4.0 in April, Microsoft has received a lot of support from leading music sites, independent record labels and various industry players. The latest versions of Nullsoft's WinAmp and Media-science's Sonique have added support for Windows Media audio formats, so you can now play MSAudio files on the same player you use for MP3s.

Windows Media Technologies also includes Media Rights Manager to address the concerns of the music industry. If the intellectual property rights of artists and companies are secured they will make more music available for Internet consumption. Currently the digital music scene on the Web is a hotbed of piracy. It is doubtful that Microsoft could remove the piracy element altogether, but they can open up legitimate avenues for honest consumers to reimburse artists for the music they download.

Microsoft has made the Windows Media Tools and Windows Media Audio SDK (Software Development Kit) available to assist developers. As MSAudio and Windows Media Rights Manager become functional on more Web sites, the opportunities for successful Internet music distribution and sales will improve and piracy concerns will decline.

If you want to learn more about Windows Media Technologies, see Microsoft's Windows Media Web site at <http://www.microsoft.com/windows/windows-media/>. You will find a copy of Windows Media Player 6.4 on apcmag.cd. If you want to learn how to create your own media using the technology discussed in this article, see Microsoft's Web Workshop at <http://msdn.microsoft.com/workshop/imedia/windowsmedia/>.

Kieran McNamee can be contacted at kmcnamee@acp.com.au. For a complete archive of APC Windows 98 columns, see <http://apcmag.com/win98/>.

Windows 98 shareware

Master Converter 2.11

A complete unit conversion utility, covers everyday and specialised requirements.

The Electric Mind 1.1

Unusual brainstorming program that uses unexpected word associations to spark creative thinking. It can be set up to handle a wide range of topics.

Pretty Good Solitaire 99 5.1.1

The ultimate program for the solitaire aficionado. It has 300 games, attractive graphics and tools to create new games.

AceReader 4.1

Educational tool that can improve reading proficiency significantly. It also makes it easier to read documents.

WinRescue 98 8.0.9

Well-designed utility package for backing up and restoring essential files; a potential lifesaver when Windows crashes.

All these packages can be found on this month's apcmag.cd, along with more detailed reviews.

Lookin' good — tailoring the Workplace Shell according to your tastes. By Christopher Relf

OS/2 Warp

Although OS/2 is widely accepted as a more efficient and stable operating system, when it comes to appearances, Microsoft has done an admirable job. Let's face it — Windows 9x looks good. Its got clean graphics, animated icons and nicely packaged themes. Sure, these touches don't make an operating system, but they do help users survive arduous hours in front of the PC.

Don't think that OS/2 doesn't have any 'look good' features, just because you can't see them in a default configuration. Warp actually has 3D effects, high-colour icons and sound schemes. Warp 4.0 is the product of continual version advancements over many years — it's not like Windows 95, which was largely rewritten from the 3.11 days. But, unlike its Windows counterpart, OS/2 enhancements are poorly coordinated, forcing Warp's old GUI and desktop schemes to work with the new enhancements and additions. Unfortunately, it's not easy to pull all of them together, but it can be done.

Visually, you need to work with five main areas: the background, icons, window colours, fonts and — a big favourite — the folder backgrounds.

Background and icons

Most people change the background first, and many make a big mistake — it can be the most resource-hungry change you can make. OS/2 users often find themselves complaining bitterly after installing a 7M bitmap on the desktop only to find it almost brings their system to its knees. Generally, the resource cost is equal to the

size of the image, so it's best to use GIFs or solid JPEG images, as they are likely to be small. In Warp 4, you can use any Warp supported image file (including JPEGs, GIFs and even TIFFs) as a background. Testing to see if it fits is as easy as dragging the file to the preview window on the Background tab under desktop Properties.

If you're interested in creating a scheme, you'll want your icons, background and sound files to form a consistent theme, so look for a source of icons and backgrounds on the Internet. This topic will be revisited next month with a few suggestions.

Colours and schemes

The method used to alter the appearance of folder windows is one of the most impressive areas of the OS/2 Workplace Shell (WPS). It's an excellent example of OS/2's drag-and-drop integration.

Open up the mixed colour palette in the System folder and then start mixing. If you are not impressed with the default colour palette, click on a white square, choose Edit Colour and get creative. After you've selected a colour to serve as a base theme, make four shades ranging from light to dark.

Finally, find a folder to play with, and start dragging colours to it from the system palette. Most areas on a folder window can be coloured, however, IBM forgot to include the close, minimise and maximise buttons; you can't change their standard grey.



Once you've chosen a scheme, try to remember what you dragged where, then re-drag each colour to each area while holding down the Alt key. This will activate your changes system-wide, and they'll remain when you reboot. (It's probably not a bad idea to make a desktop archive here, just in case you don't like your changes.)

You can also use a scheme palette to edit your folder colours, although you may find it a bit more difficult. It's fiddly, and some things can't be changed (for example, window edges). Most people will find it easier to experiment with the desktop manually.

Next month you'll learn about enhancements such as animated icons and cursors, and scheme management, which will help you keep your machine looking good.

Christopher Relf can be contacted at Christopher.Relf@start.com.au. For a complete archive of APC OS/2 columns, see <http://apcmag.com/os2/>.

OS/2 shareware

Binary News Reader 1.37

The Binary News Reader allows easy downloading and decoding of single and multipart newsgroup binary files that are MIME (Base64) or uuencoded.

NewsBeat 1.00

A small, fast and easy newsreader, but it has problems with large newsgroups.

PMINews

PMINews has a very useful and intuitive interface and allows you to navigate quickly.

ProNews/2

ProNews/2 has an excellent process manager, which gives you complete control over queued tasks, and offers message threading and customisable toolbars.

Dialog Enhancer '99

Dialog Enhancer '99 gives your OS/2 Warp system a timely overhaul, providing a consistent look for your dialogs.

All these packages can be found on this month's **apcmag.cd**, along with more detailed reviews.

Take advantage of some newer disk formats.

By Stephen Withers

Mac OS

A DVD drive is now standard on some Power Macintosh and PowerBook models. Although there is almost no Mac software on DVD-ROM, there is a growing range of DVD-video titles available.

Although you can watch DVDs on your computer, it's easy to hook up a DVD-equipped 'bronze' PowerBook G3 to your TV for group viewing with the PowerBook's S-Video output and an S-Video to video adaptor.

When the PowerBook is turned off or asleep, plug the short adaptor cable into the socket labelled 'out' below the icon of a video camera superimposed with the letter 'S'. Use an RCA to RCA video cable to connect the adaptor to the video input of your TV. Naturally, if the TV has an S-Video input, omit the adaptor and make the connection with an S-Video cable.

If you have a pair of amplified speakers, plug them into the PowerBook's sound output connector (next to the power socket.). It's possible to connect to a stereo amplifier and speakers or the TV audio input, but that's another story.

When you restart or wake the PowerBook, the TV becomes the display. Because the computer defaults to NTSC, you may need to adjust the TV's vertical hold to get a stable picture before proceeding. Once the computer's display is clear, open the Monitors & Sound control panel and select 640 by 480 PAL. You'll probably need to readjust the vertical hold after doing this. If this setting is clear, try successively higher resolutions until you've determined the best available picture, then close the control panel.

Put a DVD in the drive and launch Apple DVD Player from the Apple menu. Click the play button on the circular controller and you're off. When the DVD movie presents an onscreen menu, you can use the mouse or trackpad to control the player interface.

Keyboard commands are a lot more convenient than the controller. The important ones are Space (play/pause), Escape (disc menu), Option-Command-P (toggle between video-in-a-window and presentation modes), and the Command-left and Command-right arrows (rewind and fast forward).

Option-Command-C (hide/show controller), Command-0, 1, 2 and 3 (smallest, half, normal and full-screen video) and the Command-up and Command-down arrows (volume up and down) are handy when determining which settings give the best results on your system. Although it seems a waste of pixels, the normal size gives the best results on the PowerBook's LCD display, but full screen seems more natural on a TV.

If you forget the commands when the display is in presentation mode and the controller is hidden, simply move the mouse to the top of the screen and the menu bar will reappear.

Picture CD

Picture CD is the first application for CD-ROM, a technology developed by Kodak that allows the first session on a multi-session disc to be pressed in a similar way to CD-ROM while allowing subsequent sessions to be added by a CD-R drive.

Although Kodak is yet to provide Macintosh support on Picture CD discs, they can be used on a Mac providing File Exchange is active. If it isn't, reactivate it with Extensions Manager, or a third-party startup manager such as Conflict Catcher, and then restart the Mac.

The pictures are stored in the folder labelled, logically enough, PICTURES. Because the Picture CD specification uses the JPEG format, no special software is required to view them as long as QuickTime is installed. In fact, if QuickTime Exchange is enabled, PictureViewer will launch automatically when you double-click on an individual picture document.

If QuickTime Exchange has been turned off, you can enable it by opening the QuickTime Settings control panel, selecting QuickTime Exchange from the pop-up menu, and checking the Enable QuickTime Exchange box. You then need to restart.

Image manipulation

In addition to displaying the images, PictureViewer can also rotate, flip, print or export images in several popular formats. You can also copy the entire image, but there's no provision for selecting and crop-



One eye has been corrected with Digital Darkroom's red-eye filter. Note the reflected highlight is still visible.

ping a portion of it. The obvious way to achieve this is to export the image as a PICT file, open it with SimpleText and make the selection there, but this doesn't work — all you'll see is an empty window. Converting a Picture CD image from JPEG to PICT with MacLinkPlus will work, but if you open the result with SimpleText you'll have trouble copying a selection bigger than about 300K (about 375 by 275 pixels) unless you allocate more memory to SimpleText. You'll need about 12,500K to copy a whole picture.

Opening the JPEG image with a dedicated graphics program is a much better idea. Photoshop is ideal, but an equally suitable application may have been bundled with your scanner or digital camera. You can also use a relatively cheap program such as Color It from MicroFrontier.

Color It 4.0 includes scratch, dust and red-eye filters, which makes it especially suitable for editing family snaps. At the time of writing it cost only \$US50 plus shipping (<http://www.microfrontier.com/>). If you want something more basic, MicroFrontier's Digital Darkroom (\$US40) hits the spot. Using Digital Darkroom to remove red-eye isn't as easy as it could be, as you have to select the red area first. Repeated shift-clicking with the magic wand tool seems to be the simplest way of doing this. Demo versions of both programs are available, so you can try them first.

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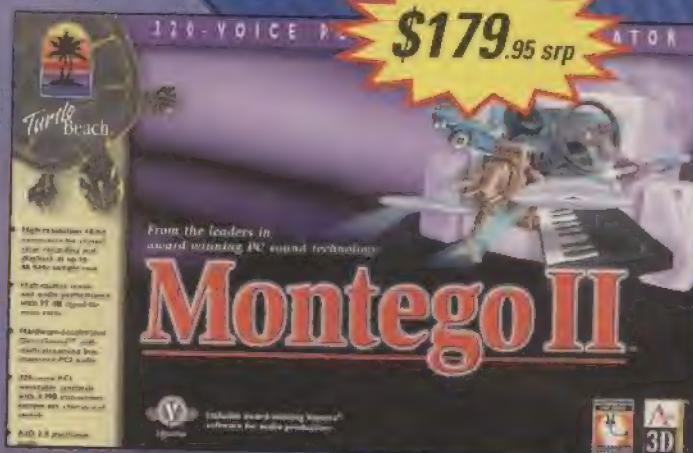
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- 10 band graphic EQ with digital display
- 128 hardware wavetable voices
- 256 software synth voices
- Win 95/98/NT 4.0



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VIC: Myer Electric 9661-1111 Troy House of Music Ringwood 9870-4143 JB Hi-Fi 9471-3511 NSW: Domayne 8778-2222
WA: Abacus 92421344 SA: Berlin Wall Software Supermarket 8231 4799

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Slideshows

You can create a slideshow of your favourite photos using QuickTime Player providing you have upgraded to QuickTime Pro. If you want to include photos from more than one Picture CD, it is easier if you start by collecting copies of all the photos you are going to use in a single folder.

Launch QuickTime Player, then select Import from the File menu, navigate to the first photo and click the Convert button. Select Fill Screen from the Movie menu so you can see the entire image.

Open a new player (select New Player from the File menu) then go through the following process for each of the remaining images. Import the picture and select Fill Screen just as you did to the first image. Copy it, then switch to the first window. Ensure that the black diamond is at the right-hand end of the progress bar and paste. As a final step, return to the second window. This is a good time to save the file, but remember to Save As or you will overwrite the file containing the first picture you opened. Remember to choose the self-contained option if you want to be able to run the slideshow without the image files you imported being present.

If any of the images you want to include are in portrait format, they will appear rotated 90°. To turn such a picture the right way up before copying it into your slideshow, open it in QuickTime Player then select Get Info from the Movie menu. Select Video Track in the left-hand pop-up menu and Size in the right-hand one. After the two curved-arrow buttons appear, click whichever one is appropriate to rotate the image, and then close the dialog box. You'll probably need to resize the movie (use Fill Screen from the Movie menu), because the Fill Screen size for landscape photos is too big for portrait

shots and the player window will extend off the screen. This means the landscape images will be smaller than necessary, but you can't have everything when working on a shoestring budget.

Be sure to rewind the movie by sliding the black diamond progress indicator in the controller before moving to the next step, or you won't see all the photos when you run the slideshow.

Select Get Info from the Movie menu, then select Controller in the right-hand pop-up menu, click on None Movie Controller and close the dialog box. This step removes the controller to make more room for the pictures. Now select Fill Screen from the Movie menu so the pictures will be shown as large as possible.

To run the slideshow, select Present Movie from the File menu. Make sure Current is selected as the movie size and click the Slide Show button. Now click the Play button to run the show. Use your mouse button to advance from one slide to the next till you've seen the last slide, then type Command-full stop, or press the Escape key.

After the slideshow, you'll need to restore the movie controller so you can rewind the sequence; in the Get Info dialog, select Movie Controller instead of None Movie Controller. The trick is to leave the Get Info dialog open the entire time you are working with the slideshow, which saves you repeat visits to the Movie menu.

A neater way of doing all this is to use Apple's free MakeEffectSlideShow (see <http://www.apple.com/quicktime/developers/tools.html>). Launch the program and select Make Effects Slide Show from the Test window. In the resulting dialog, select the images (or movies) in order. When you've chosen them all, click Cancel. Next, pick a transition effect from the list, watch the preview and explore the



The look and feel of the Apple DVD Player's controller is reminiscent of QuickTime Player.

parameters. When you're happy, click OK and you'll get the familiar Save As dialog.

Desktop pictures

Picture CD images can easily be used as desktop pictures. For convenience, copy the desired images from the CD into the Appearance folder within the System Folder and give them appropriately descriptive names. Open the Appearance control panel, click the Desktop tab, remove any existing picture, then click Place Picture and choose an image. The aspect ratio of a normal photo is 3:2 whereas most Mac displays are 4:3. This means the picture will either be distorted, cropped or letterboxed. Appearance's Position Automatically option usually does a good job of fixing this, but it is worth seeing if Center on Screen or Fill Screen looks best for any particular image.

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Mac shareware

Iconographer 1.0.2

A simple but effective design and editing environment for the 32-bit icons introduced with Mac OS 8.5.

Drop Drawers 1.0.1

Drop Drawers builds on the features offered by palette-type launcher utilities with additional presentation modes.

Screen Catcher 1.5

Screen Catcher can post-process full or partial screenshots to selected colour

palettes and direct them to a window, the clipboard, a printer or to a file as optimised JPEG, PICT or GIF images.

Sleeper 3.2b5

Sleeper implements the functions of Apple's Energy Saver control panel, plus some unique ones.

Clean-Install Assistant 1.1

CIA aids and speeds reconfiguration after a clean OS installation by isolating personal and third-party items from the

previous System Folder, and restoring them to the new one.

File Smiler 1.61

The creation of Self-Mounting Image (.SMI) files is given drag-and-drop simplicity with File Smiler. All you need is Apple's Disk Copy utility installed.

All these packages can be found on this month's **apcmag.cd**, along with more detailed reviews.

Learning how to clone the Linux setup.

By Geoffrey Bennett

Linux

Cloning a complete Linux setup can save you time when setting up a series of machines in an environment that needs identical (or at least similar) configurations. You can also use these techniques if you want to move lots of data from one location to another. (Many of the commands discussed in this article, particularly those dealing with disk images, are powerful enough to wipe out a working Linux system in a matter of milliseconds if misused. It is best that you first practise them on machines where it doesn't matter if you make a mistake.)

Copying methods

There are a number of ways to clone an existing installation of Linux, but they all fall into one of two categories: file-based or image-based. The file-based methods follow the conventional concepts of copying encountered using the `cp` command to read and write each file, and replicate data from one location to another. This isn't the most efficient way to copy an entire system. The image-based methods take a snapshot of your hard disk and copy it as an entire block, byte for byte.

The advantages of image-based copying include:

- It can duplicate the Master Boot Record (MBR) and partition table so you don't need to partition the disk you are copying to and you don't need to reinstall LILO.
- It duplicates the file system structure so you don't need to create a file system on the destination disk beforehand.
- It copies everything from the most primitive level of disk format, so you can clone a dual-boot DOS/Linux system without any extra work.

File-based methods also have several advantages, including:

- If the partitions or disks you are copying are mainly empty, it may be faster to use a file-based transfer.
- It's possible to use them with systems of differing hard disk size.

The last advantage makes a file-based copy more useful than an image-based copy, because an image-based copy must be performed between disks or partitions that are exactly the same size or where

the destination disk is larger. However, in the latter case, you will waste as much space on the destination disk as exceeds the partition size. Unless your machines really do have identical hard disks (and are set up identically in the BIOS), file-based copy is safest.

Image-based copying

Without networking the two computers, the easiest way to make a copy is to attach your new hard disk to the machine with the disk you want to copy from. If the disks are IDE and you are putting them on the same controller cable, don't forget to adjust the jumper settings on the destination disk so that it is configured as the slave.

Before you attempt to copy, it is best not to have any partitions on your source disk mounted read/write to ensure your data is stable; if you don't, you'll need to run `e2fsck` when you boot it on the new machine. There are a few ways to ensure this, but the most common is to boot from a floppy-based Linux distribution such as Tom's Root/Boot disk (also known as 'tomsrbt'). `tomsrbt` includes all the utilities mentioned in this article. The disk is available for download from Tom's Web site at <http://www.toms.net/rb/>, and there is an Australian mirror at <ftp://ftp.aarnet.edu.au/pub/linux/tomsrbt/>.

The basic command for image-based copying between two identical hard disks that are installed in the same machine (see figure 1) is very simple:

```
dd if=/dev/hda of=/dev/hdb bs=1024k.
```

Here `'/dev/hda'` is the device name to copy from, and `'/dev/hdb'` is the device name to copy to (`'if'` stands for 'input file', `'of'` stands for 'output file' and `'bs'` sets the block size, which will make the copy run more efficiently). It is essential that you haven't mounted anything on the destination disk, otherwise the copy you make will be corrupted.

That's all there is to it. There's no need to manually partition the new disk or install LILO, as that's copied in the process. You can remove the hard disk, reset it as a master, install it in your new system (assuming it is an identical system to the source) and it will boot.

Copying over a network

If you don't mind fiddling with your hardware, then the direct disk-to-disk image copy described above is probably the simplest. If not, duplicating your disk over a network may be an easier method (see figure 2). `tomsrbt` is invaluable in this case because it includes Ethernet card support and everything else you will need to do a remote copy.

You will need to use `tomsrbt` to boot both the source system and the destination system. `tomsrbt` will probe most Ethernet cards automatically at boot time, and can be set up with two commands like this:

```
ifconfig eth0 10.0.0.2 netmask 255.255.255.0 broadcast 10.0.0.255
```

```
route add -net 10.0.0.0
```

The four IP addresses above are the IP address, netmask, broadcast address and network address respectively. If you have a domain name server present on your network, place its details in `/etc/resolv.conf`, otherwise just remove that file.

If you can ping between the two computers, then copying between them is just a couple of steps away. On the destination computer, edit `/etc/inittab` and remove the `#` from the beginning of the `rshd` line, then type `kill -HUP 1`. This enables the `rshd` (remote shell) server, which can be used to help copy images to that machine. You'll also need to put this line in the `/rhosts` file on the destination computer (substitute 10.0.0.1 with the IP address of the source computer) 10.0.0.1 root.

To test the `rshd` setup, you can type `'rsh 10.0.0.2 echo test'` on the source computer, which should output `'test'`. Once it is working correctly, stay with the source computer and run the network equivalent of the previous disk image copy command by typing `dd if=/dev/hda | rsh 10.0.0.2 dd of=/dev/hda.`

Image files

Sometimes you may want to save a disk image to a file rather than copy it directly to another hard disk. This is simple as long as you have enough disk space to store the image. Set up `rshd` with `tomsrbt` as

described above on the machine with the disk you want to copy from, and run `rsh 10.0.0.2 'dd if=/dev/hda | gzip' > diskimage.gz` on the Linux box that you want to create the image file on.

The `'| gzip'` in the command will compress the disk image, so if you don't want the image compressed then leave that out.

Once you've got the image in a file, you can write it back out to a machine running `tomsrtbt` with `rshd` enabled by running `rsh 10.0.0.2 'gzip -d | dd of=/dev/hda' < diskimage.gz`.

Tom's Root/Boot disk

Because `tomsrtbt` exists entirely in RAM once it has been loaded from the floppy, any changes you make will be lost when you reboot. If you have to repeat this process more than once or twice it will get tedious, unless you customise the disk. Two scripts are included in the `tomsrtbt` package to assist you; one script will unpack the files from the floppy so that you can make whatever changes you want to, and the other script will create a personalised copy of `tomsrtbt` based on your customisations.

File-based copying

File-based copies of a hard disk require more work than an image-based copy, because you need to partition the destination disk and create a file system before you begin to copy. This can be done by temporarily installing the destination disk as a slave drive on the source Linux system and conducting the disk preparation and copy procedure from the one location. Alternatively, you can use `tomsrtbt` to boot up and prepare the disk on a clean system, establish a network connection to the source system and then initiate a file-based copy.

You will need `fdisk`, `mke2fs` and `mkswap` to partition the destination disk and create a file system. You will need to create both a Linux file system partition and a Linux swap partition using `fdisk`,

and then format them using `mke2fs` and `mkswap` (substitute `/dev/hdb1` and `/dev/hdb2` with the appropriate partition device names).

Now you've got a Linux file system, you need to mount it somewhere so that you can copy the files to it:

```
mkdir /mnt/new
mount -t ext2 /dev/hdb1 /mnt/new
```

If you've got both disks in the same computer, you can use `tar cf - / --exclude /proc --exclude /mnt/new | (cd /mnt/new; tar xpf -)` (all on one line) to copy everything to `/mnt/new`.

Breaking it down, the part to the left of the `|` reads the source files. The options to `tar` specify:

- **c** create archive (ie. read files)
- **f** output to stdout (ie. to the second `tar` command)
- **/** starting from the root directory (ie. copy everything)
- **--exclude . . .** excludes the `/proc` and `/mnt/new` directories from being copied.

If you are running a version 2.2 kernel, you should also exclude `/dev/pts`, and if you have any DOS or Windows partitions mounted, you'll probably want to exclude these too.

The part to the right of the `|` writes, the `cd` command specifies where the files will go, and the `xpf -` options mean:

- **x** extract archive (ie. write files)
- **p** preserve permissions (if you don't specify this, not all files will be created with the correct permissions)
- **f** - read from stdin (ie. from the first `tar` command)

After the files have been copied, you'll need to run `'mkdir /mnt/new/proc'` (and `'mkdir /mnt/new/dev/pts'` if you excluded that too). Although their contents shouldn't be copied, the directories themselves still need to be created.

If you want to copy your file system's contents across a network, `tar cf - / --exclude /proc | rsh 10.0.0.2 '(cd /mnt/new; tar`

`xpf -)` copies all the files from the host machine to the `/mnt/new` directory on a remote machine.

You can put the entire contents of a remote file system into one large file on the machine if you run this command on:

```
rsh 10.0.0.2 'tar cf - / --exclude /proc | gzip' > myfiles.tar.gz
```

And to put the files back:

```
rsh 10.0.0.2 'cd /mnt/new; gzip -d | tar xpf -' < myfiles.tar.gz
```

After you've finished your file copy, the final step is to make the hard disk bootable by installing LILO. If you copied your files directly from disk to disk, put the hard disk in a new machine and boot the system using your `tomsrtbt` floppy. If you copied your files via a network you can simply boot your system using the `tomsrtbt` floppy. When you've logged in, mount the hard disk with a command such as `'mount -t ext2 /dev/hda1 /mnt'` and then run:

```
cd /mnt
chroot /mnt /bin/bash
```

The `chroot` command changes your shell's environment so that it looks like `'/mnt'` is the root directory. This lets you run programs from your hard disk as if you had booted from the hard disk rather than the floppy. Now you can run the LILO installation by typing:

```
/sbin/lilo
exit
umount /mnt
```

Now your original system has an identical twin.

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Linux freeware

Xsnow

A Christmas amusement for the Linux desktop.

Mtools

A set of tools for handling MS DOS-format floppy disks so you no longer have to mount and unmount the disks.

Bashrc

Bashrc presents some handy command shell customisations.

Check Book Balancer

Check Book Balancer (CBB) is a simple GUI-based personal finance application.



All these packages can be found on this month's **apcmag.cd**, along with more detailed reviews.

Understanding and using classes in object-oriented programming. By Michael Smith

Simple C++

Classes are the building blocks of object oriented programming (OOP). A class is a template definition of an object, describing the data and functions (methods) of a particular type of object. This month you'll learn more about classes and how to use them.

In the sample class shown in listing 1 (see page 166), the line `class foo` indicates the name of the class. The class members — both data members and function members (methods) — are listed inside the braces. You can see that some of these members are *public*, while others are *private*. Public members can be accessed from outside the class, while private members can only be accessed from inside the class.

The first three members, `foo(void)`, `foo(int val)` and `foo(double num, int val)`, are each instances of a special method called a *constructor*. A constructor is called when an object is created and it always has the same name as the class. So in this case, every time an object of class `foo` is created, a constructor method is called.

Listing 2 shows you three ways to instantiate (create) a `foo` object (see page 166). The second of these, `foo yourfoo(5)`, has an integer parameter (5) so the second constructor is called. The first object, `myfoo`, is created without any parameter, so the first constructor is executed. You can have as many constructors as necessary to allow the object to be instantiated in different ways and the constructors can accept nearly any combination of parameters. You cannot, however, instantiate an object with parameters for which you don't have a constructor. If listing 2 contained a line such as `foo anotherfoo(2, 4, 5)`, it would cause an error because there is no constructor that handles three integer parameters. Notice that none of the constructors have a return type; constructors never return a value.

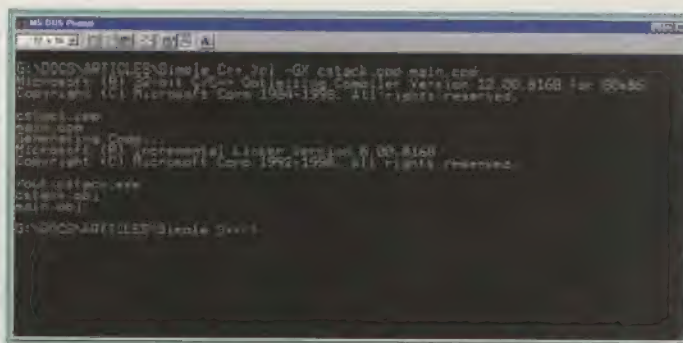
The line after the constructors, `~foo(void)`, is called a *destructor*. Just as a constructor is executed each time an object is instantiated, a destructor is executed when the object is destroyed. Frequently an object

will allocate memory, open a file or perform some other task that uses up system resources. Just as it's good practice to perform tasks like this in the constructor, it's good practice to free those resources in the destructor. If the constructor opens a file, the destructor often closes it. If the constructor allocates memory, the destructor often frees that memory. This symmetry (hopefully) ensures that resources are automatically freed. This means there is one less thing for the programmer to worry about. A destructor always has the same name as the class, but is prefixed with a tilde (~) character.

The next part of the class is the data member, `ExtData`. This data member can be accessed from outside the class, just as it is in listing 2. In general, this is considered bad practice. One of the cornerstones of OOP is *encapsulation* or *information hiding*. If data can be accessed or even changed by any part of the program, then that data is not encapsulated. If you later change the definition of that data, you will probably break the program — possibly in multiple places. A better solution is to declare all data members *private*, and provide public functions to get and set their values. This strategy is used for the data member `IntData`; the methods `SetData` and `GetData` are provided for its access.

Notice that the code for the method `GetData` is included in the class declaration (see listing 1). `GetData` is implemented as an *inline* function. Inline functions are generally much faster to execute than normal functions, but they use up more memory. `SetData` is not inline, so it will be implemented separately.

Like the private data members, private methods can only be called from within the class.



Listings 3, 4 and 5 show a working example of a program, which uses a class (see page 166). The class, `CStack`, is declared in `CStack.h` (listing 3). The class has a constructor and a destructor, as well as two public methods: `Push` and `Pop`. Although there is only one constructor, it provides a default value for its parameter, so the parameter can be omitted. The `CStack` class is therefore instantiated with one argument (`CStack s(100)`) or no argument (`CStack s`). The latter form uses the default size of 1000. The `Push` and `Pop` methods act much as you would expect, returning a Boolean `true` or `false` value

The sample program

Building the sample program, `CStack.exe`, is relatively easy. It was built using three of the most popular Windows compilers, but you can use any standard compiler with little difficulty.

Using Microsoft Visual C++ 6.0, the command is `cl -GX cstack.cpp main.cpp`.

For Borland C++ 4.0 it is `bcc32 cstack.cpp main.cpp`.

Using the DJGPP GNU C++ compiler the command is `gxx cstack.cpp main.cpp -o cstack.exe`.

The command should be the same for the GNU compiler on Linux or any other platform, except you should probably change `-o cstack.exe` to `-o cstack` on Linux/Unix platforms.

C++ source code

Listing 1: Sample class

```
class foo {
public:
    foo( void );
    foo( int val );
    foo( double num, int val );
    ~foo( void );
    int  ExtData;
    void SetData( int val );
    int  GetData( void )
        { return IntData; }
private:
    int IntData;
    int ChangeData( void );
};
```

Listing 2: Using the sample class

```
// Instantiate an object
// of type "foo"
foo myfoo;
// Instantiate other objects
// using the alternate
// constructors
foo yourfoo( 5 );
foo theirfoo( 4.1, 2 );

// Access the public data
myfoo.ExtData = 6;
// Access a public method
yourfoo.SetData( 2 );
```

Listing 3: CStack.h

```
class CStack {
public:
    CStack( int size=1000 );
    ~CStack( void );
    bool Push( int val );
    bool Pop( int &val );
private:
    int *buff;
```

```
int count;
int buffsize;
bool Expand( int size );
};
```

Listing 4: CStack.cpp

```
#include <iostream>
#include "cstack.h"

CStack::CStack( int size )
{
    count = buffsize = 0;
    buff = NULL;
    Expand( size );
}

CStack::~CStack( void )
{
    delete [] buff;
}

bool CStack::Push( int val )
{
    if (count==buffsize)
        if (!Expand(2*buffsize))
            return false;
    buff[count++] = val;
    return true;
}

bool CStack::Pop( int &val )
{
    if (count) {
        val = buff[--count];
        return true;
    } else {
        return false;
    }
}
```

```
bool CStack::Expand( int size )
{
    int i;
    int *tmp = new int [size];
    if (!tmp)
        return false;
    if (count>size)
        count = size;
    if (buff) {
        for (i=0; i<count; i++)
            tmp[i] = buff[i];
        delete [] buff;
    }
    buff = tmp;
    return true;
}
```

Listing 5: main.cpp

```
#include <iostream>
#include "cstack.h"

int main( void )
{
    CStack s(50);
    int val;

    do {
        std::cin >> val;
        s.Push( val );
    } while (val!=0);

    while (s.Pop( val ))
        std::cout << val << '\n';
    return 0;
}
```

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(true = operation succeeded, false = operation failed). When you look under the hood (the private members), you see that the stack is implemented using an array that is resized, as needed, by an Expand function. This is a good example of encapsulation. The public interface doesn't indicate how the stack is implemented, so you can change that implementation without affecting the rest of the program. You simply have to keep the interface constant.

If you look at CStack.cpp (listing 4), you can see the implementation of the class methods. Each method declared in a class (except any inline ones) should be implemented in a C++ file. In this example the constructor allocates a buffer for the stack

data using Expand. The buffer is later freed by the destructor. The constructor also initialises all of the data members to appropriate starting values. The Push method expands the buffer, if needed, then stores the data being pushed. It can only fail if the memory allocation fails. The Pop method removes a data value and passes it back to the calling program. It can fail if you try to Pop from an empty stack. The Expand method allocates a new (bigger) buffer, then copies any data values from the old buffer and frees the old buffer.

The encapsulation provides a few safety features. First, the main program cannot access the data buffer directly, which allows the CStack object to maintain integrity of the data without any fear that it will be

manipulated. Second, the resizing of the buffer is done using a private method. This means that the program cannot adjust the buffer size (and possibly mess it up). If you choose to change the implementation to use a linked list or even a database engine, the calling program won't change.

The final part of the puzzle is the main program, Main.cpp (listing 5). A CStack object is instantiated and then used to push some values onto the stack, then pop them off again. This is an example of simple C++ working at its best.

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Using checkboxes and radio buttons. By David Williams

Java

Everyone has seen a checkbox — it's a little box that is either ticked or not, or crossed or not. It represents a setting that is either turned on or off.

A radio button is similar in that it is used to turn settings on or off, but it is used to select one of several options in a group. Only one radio button in the group can be selected at a time. When you select a radio button, every other button in the same group is deselected.

In short, a checkbox is used to toggle individual settings on or off, while a radio button is used to select one option from several alternatives.

Imagine you were creating a pizza ordering applet. The order screen would probably ask what type of pizza is being ordered — cheese, pepperoni, seafood or meat lovers. In this case, you would use a set of radio buttons because you want the customer to make one choice from a specified set of alternatives.

The screen could also ask if the customer wants to order additional items like garlic bread. Because the customer has a choice, you would use a checkbox so the customer can tick the appropriate box to indicate whether they want to order additional items.

Such an applet can be found in listing 1 and the corresponding HTML code is shown in listing 2 (see page 168).

Astute APC readers will notice that a radio button is never referred to in the listing. In reality, Java only defines a 'Checkbox' graphical object. A Checkbox is a Boolean entity that represents TRUE when it is checked and FALSE when it is empty. To place a checkbox in a window, you create an object of class Checkbox, supplying the checkbox's label as an input parameter as shown below:

```
Checkbox CheckboxReference = new Checkbox (labelString);
```

The checkbox appears empty and its label is located to the right of the box.

The state of a checkbox can be set with the `setState` method to give it an initial value of checked or unchecked. This call is defined:

```
CheckboxReference.setState (booleanValue);
```

A Checkbox object is, by itself, a checkbox as described above. Adding multiple Checkbox objects to a window creates multiple checkboxes as you would expect, and each is independent. Checking one checkbox has no effect on the state of any of the other checkboxes.

Java defines radio buttons as a group of checkboxes. So, for each group of radio buttons, you must create an object of the class `CheckboxGroup`. Then, as checkbox objects are added to a panel, you simply specify that they are part of a group. Any checkbox associated with the group takes on the behaviour of a radio button, as described above. Checking any checkbox in a group will clear any other checkbox in the same group. Your program simply needs to create the checkbox group, add the checkboxes to the group, and then let the checkbox group class take care of itself.

To begin this process, create a checkbox group object:

```
CheckboxGroup checkboxGroupReference = new CheckboxGroup ();
```

To add the checkboxes to this group so they will appear as radio buttons, simply create objects of the `Checkbox` class, but use a different constructor from the one used when creating a standalone checkbox:

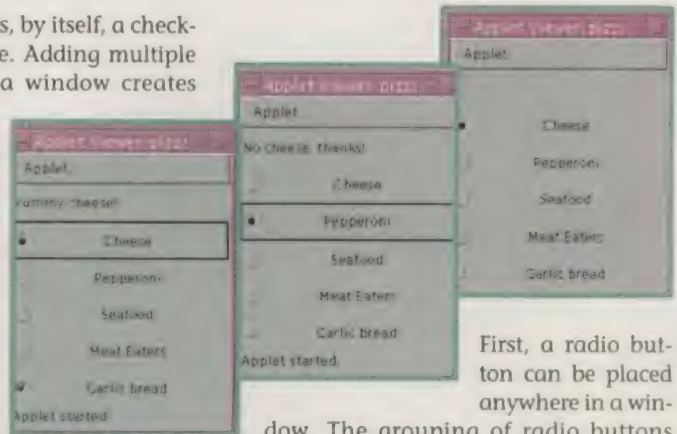
```
Checkbox CheckboxReference = new Checkbox (label, checkboxGroupReference, initialState);
```

So, for example, to create the radio button for a cheese pizza, you write:

```
cheese = new Checkbox ("Cheese", pizzaType, true);
```

Note that the variable `pizzaType` contains a reference to the checkbox group with which this checkbox object is to be associated.

There are several things that you need to keep in mind when creating radio buttons.



First, a radio button can be placed anywhere in a win-

dow. The grouping of radio buttons occurs solely when the checkbox object is created, not when the object is added to a panel. In theory, there is no reason why the radio buttons in a group have to be physically located next to each other, nor is there a reason why radio buttons in different groups cannot be located next to each other. Of course, doing either of these may be confusing for the user.

Second, only one checkbox object in a checkbox group can ever have a state of TRUE at any given time. All the rest will always be FALSE.

Third, although each radio button will appear with its own label, there is actually no way to label the checkbox group itself. Therefore, it is often helpful to place all the checkboxes within a group in their own panel with a descriptive label.

Now you can create checkboxes and radio buttons. You can even set the state of a checkbox (or radio button, because a radio button simply is a `Checkbox` object; the `setState` method works just the same). To query the value of a `Checkbox`, you can use a call to the `getState` method by writing:

```
boolean variable = checkboxReference.getState ();
```

This means that in any event-handling procedure, such as a button-click, the value of all checkboxes and radio buttons can be queried. Note that because each radio button is really a separate checkbox, each one can have its value queried, but only one will have the value TRUE.

It is also possible to respond to the event raised when the user clicks a checkbox. In this case an `ItemEvent` is raised. To make a program respond to an item

Java source code

Listing 1: Pizza ordering applet

```
import java.applet.*;
import java.awt.*;
import java.awt.event.*;

public class pizza extends
Applet implements ItemListener
{
    private CheckboxGroup piz-
zaType;
    private Checkbox cheese, pep-
peroni, seafood, meat, gar-
licBread;
    private Label theLabel;

    public void init ()
    {
        Panel p = new Panel ();
        p.setLayout (new GridLayout
(6, 1));
        theLabel = new Label ("");
        p.add (theLabel);
        pizzaType = new CheckboxGroup
();
        cheese = new Checkbox
```

```
("Cheese", pizzaType, true);
        cheese.addItemListener
(this);
        p.add (cheese);
        pepperoni = new Checkbox
("Pepperoni", pizzaType, false);
        pepperoni.addItemListener
(this);
        p.add (pepperoni);
        seafood = new Checkbox
("Seafood", pizzaType, false);
        seafood.addItemListener
(this);
        p.add (seafood);
        meat = new Checkbox ("Meat
Eaters", pizzaType, false);
        meat.addItemListener (this);
        p.add (meat);
        garlicBread = new Checkbox
("Garlic bread");
        p.add (garlicBread);
        setLayout (new BorderLayout
());
        add (p, "Center");
    }
}
```

```
public void itemStateChanged
(ItemEvent theEvent)
{
    if (cheese.getState ())
        theLabel.setText ("Yummy
cheese!");
    else
        theLabel.setText ("No
cheese, thanks!");
}
}
```

Listing 2: HTML code

```
<html>
<head>
<title>Pizza shop</title>
</head>

<body>
<applet code="pizza.class"
width="200"
height="200"><applet>
</body>
</html>
```

apcmag.cd

event, you must register an item listener with the checkbox (see APC September, page 159). This means a new method, `itemStateChanged`, must be implemented in whichever class responds to the event. The sample pizza program does this to display a simple message whenever the cheese pizza is selected. Normally it would not react to a click on a checkbox or radio

button in such a way, but it helps demonstrate that the program can respond to such events if necessary. If you want to handle an event for any radio button within a group, then all individual checkboxes that make up the group must have an event handler registered for them; you cannot register an event handler for the group as a whole.

Over the next few months, you will continue to learn about visual elements that help you create effective user interfaces for your Java applets.

David Williams can be contacted at dave@qed.newcastle.edu.au. For a complete archive of APC Java columns, see <http://apcmag.com/java/>.

I Have too many Monitors!

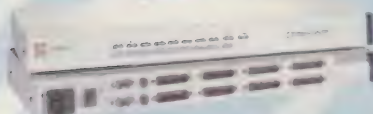
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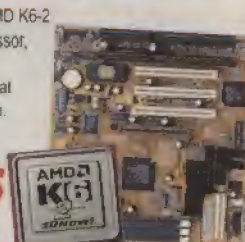
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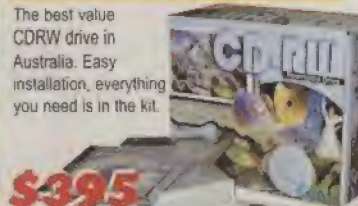
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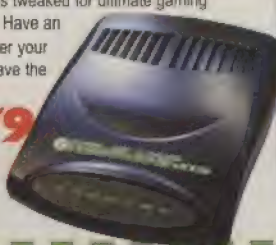
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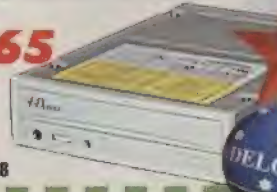
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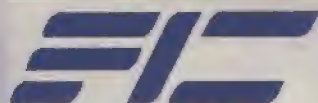
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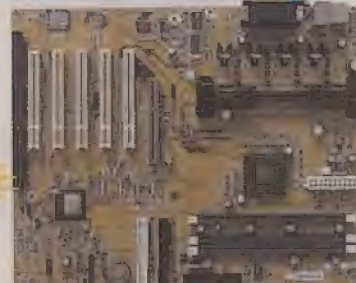
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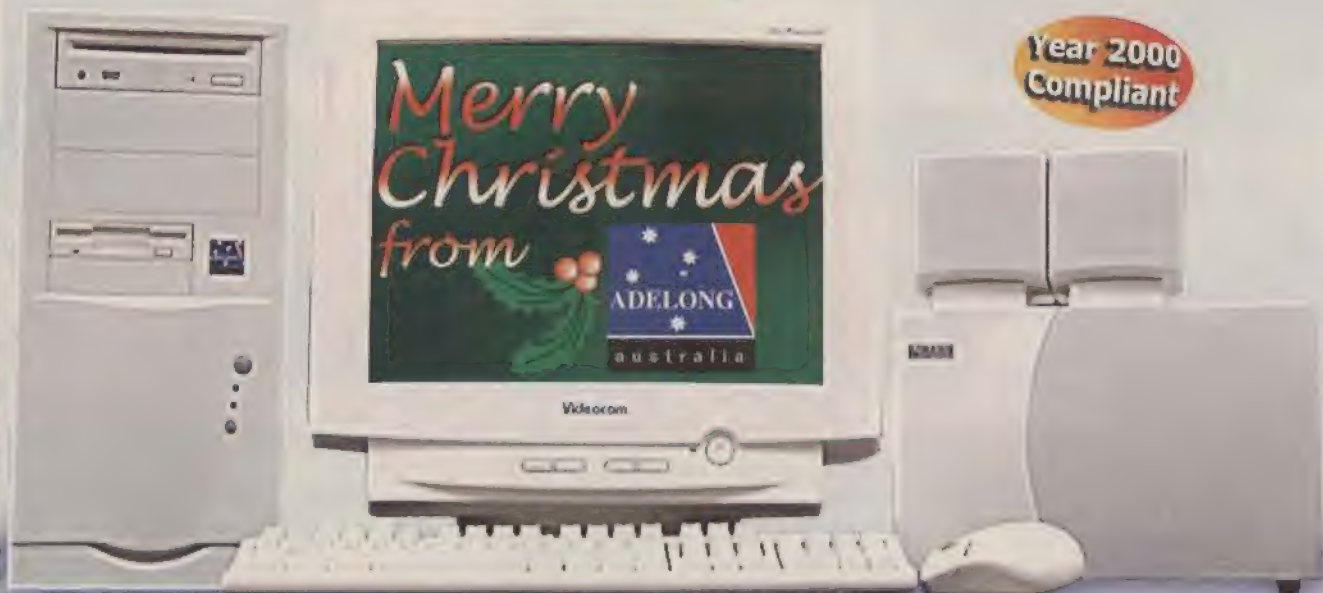
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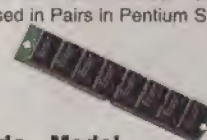
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RAGEN025	64MB PC100 SDRAM	\$Call	RAGEN026	128MB ECC PC100 SDRAM	\$Call	RAGEN006	32MB EDO SIMM 72Pin	\$145

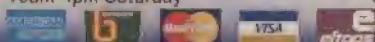
Due to worldwide shortages, call for latest prices on SDRAM Memory

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Adelung Computers

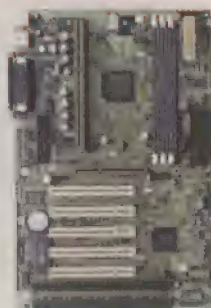
ADELUNG
Australia

Mainboards

AOpen

AOpen AX6BC Mainboard

Introducing the AOpen AX6BC Mainboard featuring the Intel BX Chipset. A unique jumperless design, CPU monitoring & protection circuitry combines ease of use with reliability and performance. Winner of many international awards you can be sure that the AX6BC Mainboard will work with you, not against you.



- Supports Intel Pentium II 233 - 450Mhz, Pentium III up to 550Mhz & Celeron Processors,
- 5x PCI, 2x ISA, 1x AGPx 2
- 768MB SDRAM for 3x DIMM slots
- 2x Serial, 1x Parallel, 2x USB Ports
- 2x EIDE Controller & ATX Form Factor
- Supports Wake on LAN, DMI, SB-LINK

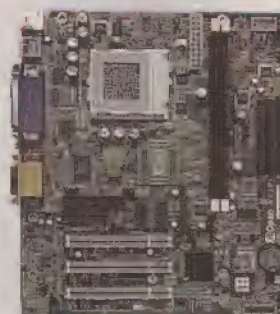
Pentium III Ready

\$195

MBACE000

AOpen MX3W Celeron Mainboard

The AOpen MX3W supports the latest Celeron (PPGA) Socket 370 Processors to 500Mhz. Powered by the Intel 810 DC100 Chipset and features jumper less design and an integrated 2D/3D Graphics Engine with Dynamic Video Memory.



- Supports Intel Celeron Socket 370 (300 - 500Mhz)
- 66/100Mhz Front Side Bus
- Integrated 4MB Video & AC97 SoundCard
- Up to 512MB SDRAM for 2x DIMM slots
- 3x PCI, 1x AMR (Audio/Modem Riser)
- 2x EIDE UDMA/66 Controller
- Micro ATX Form Factor

Integrated Video and Sound

Optional add on "Software Modem" **\$30**

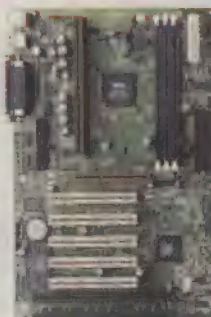
MBACE010

\$225

MBACE005

AOpen AX63 Pro Mainboard

The AOpen AX63 Pro Mainboard brings true computing performance at a very affordable price. Powered by the advanced VIA Apollo Pro Plus AGP chipset the AX63 Pro Mainboard supports technologies such as Jumperless design, Resettable Fuse for USB & K/B, BIOS flash protection and CPU protection.



- Supports Intel Pentium II 233 - 450Mhz, Pentium III & Celeron Processors to 700Mhz
- Supports PCI33 133Mhz RAM
- 5x PCI, 2x ISA, 1x AGPx 2 Expansion slots
- 768MB SDRAM for 3x DIMM slots
- 2x Serial, 1x Parallel, 2x USB Ports
- 2x EIDE Controller & ATX Form Factor

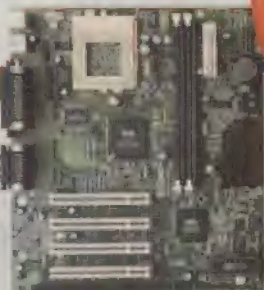
133Mhz SYSTEM BUS READY

\$195

MBACE007

AOpen MX59 Pro Mainboard

AOpen MX59 Pro Mainboard Supporting the latest Socket 7 offerings from Intel, Cyrix & AMD the MX59 Mainboard also offers an integrated graphics card & sound card in one. Ideal for upgrades or budget PC offerings.



- Supports AMD K6-2 266-450Mhz & K6-3 400-450Mhz
- Supports Intel Pentium, MXX & Cyrix MII 300-366Mhz
- 66/100Mhz Bus speed
- 2D/3D Graphics Engine (4/8Mb shared memory) & AC97 Sound
- 2 Dimm Slots of Max. 512Mb Memory
- 4X PCI, 1X ISA, 2x EIDE UDMA/66
- Micro ATX

Integrated Video and Sound

Socket 7

\$175

MMACE004

AOpen 48X EIDE CD-ROM

- ATAPI IDE CD-ROM
- Ultra DMA Supported
- 512Kbytes buffer
- Compatible with CD-DA, CD-ROM/XA, CD-I/MPEG, Photo CD, Karaoke CD, CD, CD-RW, Packet write
- Audio Extraction
- MAX Transfer rate 7200 Kb/sec

\$95

MMACE001

AOpen 10X EIDE DVD-ROM

- 10X DVD-ROM Transfer Rate Up To 13850 KB/sec
- 40X CD-ROM Transfer Rate Up To 6000 KB/sec
- Supported IDE / Ultra-DMA33 and MW DMA mode 2
- Supported CD/DVD Formats Including CD-R/RW and DVD-R/RW
- Slot-In Loading Mechanism / Vertically and Horizontally Use

\$265

MMACE009

AOpen 6X EIDE DVD-ROM

The AOpen DVD-ROM will allow you to watch the latest Hollywood blockbuster or play the latest multimedia titles on your PC today. Not only will the AOpen DVD-ROM play all your DVD media but also your existing CD, CDR & CDRW at 32X Max Speed.

\$199

MMACE008

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Adelong Computers



GIGABYTE

Mainboards

Dual BIOS

Advanced Technology is pleased to introduce the BIOS, a "hot spare" for your system. In the event that your primary BIOS fails, the second BIOS boots you up almost automatically. A feature found in the GA-BX2000, GA-5AX & GA-6BXDU boards.

GA-BX2000

- Intel BX Chipset Slot 1
- Support Intel Pentium II/III & Celeron Processors
- Supports 66/75/83/100/112/133Mhz System BUS
- 4 DIMM sockets to 1GB DRAM
- 5x PCI, 1x AGP, 2x ISA Expansion slots
- ATX Form Factor with USB



\$225

MBGIG024

GA-5AX

- ALI - Aladdin V AGPset
- Supports Intel Pentium to 233MMX, Cyrix to 333Mhz, AMD K6-2, K6-3 to 450Mhz
- 512KB Cache onboard
- 3 DIMM sockets to 768MB DRAM
- 5x PCI, 1x AGP, 2x ISA Expansion slots
- ATX Form Factor with USB

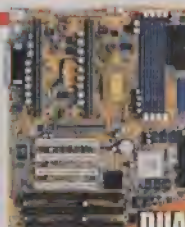


\$150

MBGIG025

GA-6BXDU

- Intel 440BX AGP Chipset
- Dual Channel Ultra 2 Wide SCSI
- Support Dual Pentium II/III Processors up to 600Mhz
- Supports 66/100 Mhz & Auto Selection Clock
- 3x Ultra 2 SCSI, 1x Ultra SCSI Ports
- 4x PCI, 3x ISA Expansion Ports & 1x AGP Port

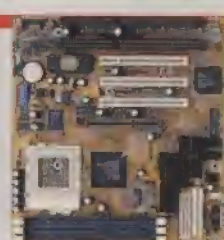


\$865

MBGIG023

GA-5AA

- Ali Chipset, Socket 7
- Supports Intel Pentium to 233MMX, Cyrix to 333Mhz, AMD K6-2, K6-3 to 450Mhz
- Clock Multiplier 1.5 to 5.5X
- 3 DIMM Sockets to 768MB DRAM
- 1x AGP, 3x PCI, 2x ISA
- Baby AT Form Factor



\$145

MBGIG021

ABIT

ABIT BE6 Mainboard

The latest offering from ABIT features the Intel BX chipset based Slot 1 Mainboard supporting the Ultra DMA/66 IDE protocol and SOFT MENU™ technology.



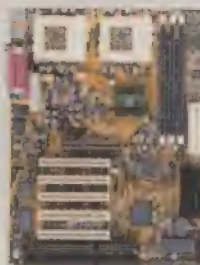
- Supports Intel Pentium II/III and Celeron to 600Mhz
- 3 x DIMM sockets to 768MB SDRAM
- 2 x UDMA33/66 IDE Ports, 2 x UDMA33 Ports
- 1 x AGP, 5 x PCI, 2 x ISA Ports
- Onboard Serial, Parallel, USB and I/O

\$255

MBABI001

ABIT BP6 Dual Celeron Mainboard

ABIT announces the release of the World's First Dual Socket 370 motherboard, the BP6 doubly defies the limitations of Intel's BX chipset by offering both Dual Socket 370 CPUs and UDMA/66 IDE Ports satisfying even the most demanding users.



- Supports up to 2 x Celeron Processors to 500Mhz
- 3 x DIMM sockets to 768MB SDRAM
- 2 x UDMA33/66 IDE Ports, 2 x UDMA33 Ports
- 1 x AGP, 5 x PCI, 2 x ISA Ports
- Onboard Serial, Parallel, USB and I/O

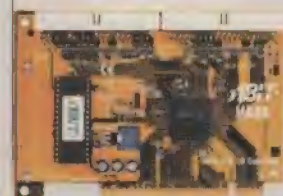
\$285

MBABI002

HotRod UDMA/66 PCI Accelerator

With the help of the ABIT Hot Rod 66 your mainboard can now support the new UDMA/66 specification. The new disc interface provides maximum disc performance using current PCI technology. Special 80-conductor cable is supplied reducing crosstalk and interference in addition to a simple plug and play installation process.

- UDMA/66 performance
- Simple installation
- Includes Cables



HOT

\$99

MBABI003

Adaptec

ADAPTEC 2906 PCI CARD FOR DESKTOP PCS

Connect up to 7 SCSI devices and gain great performance by moving to SCSI with the Adaptec 2906. Run your ZIP drive or Scanner up to 6 times faster than with a parallel port connection. Adaptec EZ-SCSI Software is included to help you manage your peripherals.

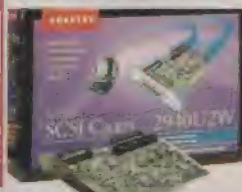


\$115

CCGEN021

ADAPTEC 2940U2W

Unleash the full potential of your server or workstation When it comes to boosting the performance of servers and workstations to 80Mb/s utilising Ultra2 SCSI (LVD) technology. By combining the Adaptec 2940U2W with high-performance disk drives you'll get performance worth howling about.



RETAIL KIT \$709

CCGEN018

OEM \$455

CCGEN022

ADAPTEC USBConnect 2000

Connect up to 7 SCSI devices to your PC. Notebook or Macintosh. USB Connect 2000 converts a USB port to SCSI in seconds without tedious time-consuming restarts.



NEW

\$159

CCGEN006

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Adelung Computers

Hard Drives

Western Digital

Sporting the industry's first **Ultra ATA/66** high speed data transfer feature, the new Caviar drives feature a maximum transfer rate of 66Mb/s. That's double the speed of its nearest rival. All Western Digital Caviar drives undergo 200 rigorous tests before shipping to ensure compatibility and reliability with all your existing hardware and software applications.

Desktop EIDE Drives

NEW

The WD Caviar family is the ideal solution for desktop personal computers and provides the best combination of performance and value for entry-level to mainstream PCs.

Code	Size (GB)*	Seek	RPM	Cache	Price
HDWES003	6.4GB	9.5ms	5400	2MB	\$245
HDWES005	10.2GB	9.5ms	5400	2MB	\$275
HDWES006	13.6GB	9.5ms	5400	2MB	\$310
HDWES007	20.5GB	9.5ms	5400	2MB	\$495

Performance EIDE Drives

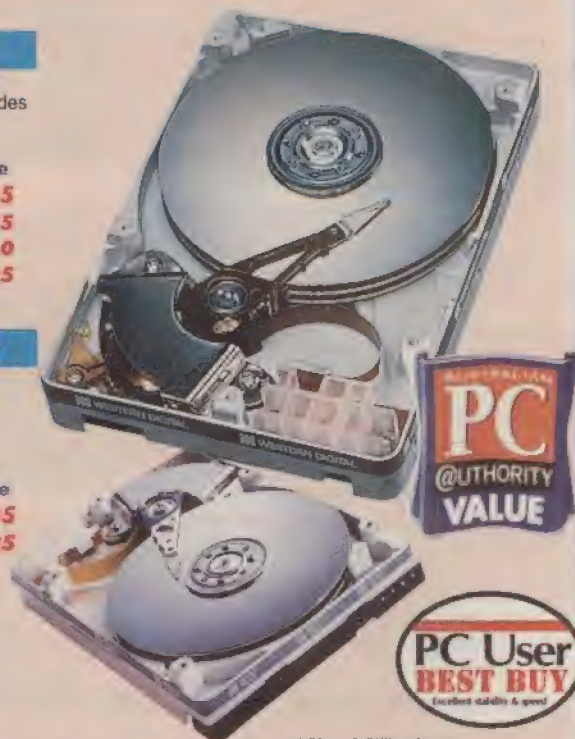
NEW

Designed for high-end desktop PCs and single user workstations, WD Expert drives outperform ordinary EIDE and even low-end SCSI solutions with average speeds 20 percent faster than conventional 5400 RPM EIDE drives.

Code	Size (GB)*	Seek	RPM	Cache	Price
HDWES008	9.1GB	9ms	7200	2MB	\$335
HDWES009	18GB	9ms	7200	2MB	\$485

Data Lifeguard

The Data Lifeguard feature is in every Western Digital hard drive. Data Lifeguard protects end user data by automatically detecting, isolating and repairing possible problem areas before data loss can occur.



* 1Gb = 1 Billion bytes



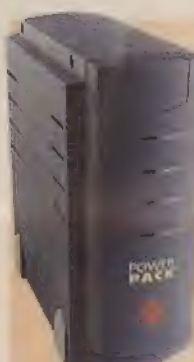
Protecting your Computer and peripherals.



BlackoutBuster (500 VA)

Is a UPS that has all the features to satisfy all your needs. Protects a standard PC for up to 25 mins.

\$285
PSPKE000



Add the Powerpack

For increasing the power capacitor backup time of the system. One powerpack doubles the BlackoutBusters power. Doubles backup time to 50 mins.

\$270
PSPKE003



Smartpack

Adding Smartpack allows BlackoutBuster to be monitored and controlled by a computer.

\$165
PSPKE001

Code	Model	Price
PSPKE000	Blackout Buster 500VA	\$285
PSPKE001	Smartpack	\$165
PSPKE002	MicroPack	\$65
PSPKE003	Powerpack 500VA	\$270
PSPKE004	Blackout Buster 1000VA with Smartpack	\$690



MicroPack

This is an attachment for auto matic shutdown of Windows, OS/2 and Novell network operating systems.

\$65
PSPKE002



Emergency backup battery



Voltage protection



Power Surge protection



Internet line protection

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ADELONG
AUSTRALIA

Quantum



Quantum Fireball™ Plus KA

Blazing Performance and Rock-Solid Reliability for the Desktop

The Fireball Plus KA hard disk drive brings workstation-level performance to the desktop with a 7,200 RPM rotational speed, 8.5 millisecond (ms) average seek time, and a huge 512 kilobyte buffer. It's also the first disk drive to feature Quantum's revolutionary Data Protection System (DPS) that verifies drive functionality in 90 seconds or less.

Code	Capacity	Spindle Speed	Interface	Price
HDQTM048	6.4GB	7200RPM	Ultra ATA/66	\$245
HDQTM049	9.1GB	7200RPM	Ultra ATA/66	\$255
HDQTM050	13.6GB	7200RPM	Ultra ATA/66	\$299
HDQTM051	18.2GB	7200RPM	Ultra ATA/66	\$449

Quantum Fireball™ CX

Solid Reliability and Performance at an affordable price

The new Quantum Fireball CX hard disk drive continues the award-winning Fireball legacy of industry-leading performance with rock-solid reliability.

Code	Capacity	Spindle Speed	Interface	Price
HDQTM052	6.4GB	5400RPM	Ultra ATA/66	\$205
HDQTM053	10.2GB	5400RPM	Ultra ATA/66	\$249
HDQTM047	13GB	5400RPM	Ultra ATA/66	\$285
HDQTM054	20GB	5400RPM	Ultra ATA/66	\$475

High performance disk solutions from Seagate catering for:

- High end multimedia & video applications (A/V)
- Graphics and 3D Applications
- Internet/Intranet based web servers
- High performance workstations, servers and super computers

Seagate Medalist Pro

Cost effective, high performance SCSI hard drives with 512K cache and a spindle speed of 7200RPM.

Code	Model	Capacity	Interface	Tr/Rate	Price
HDSGT026	ST36530W	6.4GB	Ultra Wide SCSI	40Mbps	\$559
HDSGT038	ST36140W	9.1GB	Ultra Wide LVD68	80Mbps	\$595

Seagate Barracuda

High Capacity, ultra high performance SCSI Hard Drives with a seek time of 7ms and a spindle speed of 7200RPM.

Code	Model	Capacity	Interface	Tr/Rate	Price
HDSGT014	ST39173W	9.1GB	Ultra Wide SCSI	40Mbps	\$735
HDSGT027	ST39173LC	9.1GB	LVD 80 Pin	80Mbps	\$735
HDSGT028	ST39173LW	9.1GB	LVD 68 Pin	80Mbps	\$735
HDSGT036	ST39173FC	9.1GB	Fibre Channel	100Mbps	\$735
HDSGT029	ST118273LC	18GB	LVD 80 Pin	80Mbps	\$1145
HDSGT037	ST118273FC	18GB	Fibre Channel	100Mbps	\$1145

Seagate Cheetah

Ultimate Performance and high-powered workstations. With an industry leading 10,000 RPM spindle speed & a cache buffer of 512K.

Code	Model	Capacity	Interface	Tr/Rate	Price
HDSGT031	ST39102LC	9.1GB	LVD 80 Pin	80Mbps	\$1075
HDSGT035	ST39102FC	9.1GB	Fibre Channel	100Mbps	\$1075
HDSGT033	ST118202LC	18GB	LVD 80 Pin	80Mbps	\$1625
HDSGT038	ST118202FC	18GB	Fibre Channel	100Mbps	\$1625

LVD:

Low Voltage Differential Drives are for use with Ultra 2 SCSI Controllers such as the Adaptec 2940U2W Controller giving you a transfer rate of 80Mbps. Backwards compatible with Ultra & Ultra Wide SCSI Controllers.



TravelStar 2.5" IDE Drives

Experience blistering performance on a notebook computer. The IBM range of TravelStar IDE drives feature 512K of cache accessed via an Ultra ATA interface. Compatible with most notebook & laptop computers.

Code	Capacity	Seek Time	Tr/Rate	Price
HDSMT025	2GB	13ms	33Mb/s	\$310
HDSMT026	4GB	12ms	33Mb/s	\$345
HDSMT027	6.4GB	12ms	33Mb/s	\$460
HDSMT028	10GB	12ms	33Mb/s	\$499

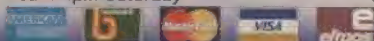
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DIAMOND

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Stealth III S540


PCI NOW AVAILABLE

With Diamond's Stealth III S540 Xtreme, Xtreme gaming has arrived! Stealth III S540 Xtreme delivers robust 2D/3D features and speedy performance at an unbelievable price.

Based on the S3 Savage4 Xtreme chipset and featuring S3TC texture compression, integrated advanced 3D quality features include 128-bit processing, 32MB of memory, up to AGP 4X support, a 32-bit 3D rendering pipeline and massive texture processing, Stealth III S540

Xtreme delivers stunning visual quality at blazing speeds for the hottest 3D games, Stealth III S540 Xtreme is a complete solution, powering colorful 2D business applications with amazing speed and accelerating cinema-quality DVD movies.

32MB PCI
\$195
 DCDIA031

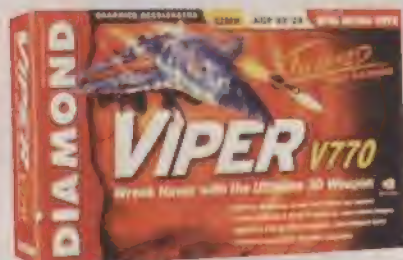
32MB AGP OEM
\$169
 DCDIA023

Xtreme
\$265
 DCDIA030

Viper V770

Wreak Havoc with the Ultimate 3D

The Viper V770 features 32MB memory & 128-bit power for fierce 3D and 2D graphics performance. Based on the NVIDIA RIVA TNT2 - with the latest 3D technology, AGP 4X support, and full optimization for Windows 95/98 and Windows NT 4.0. Viper V770 Ultra! goes further to include a tweaked hardware design for the fastest gaming solution on earth.



32MB ULTRA
\$365
 DCDIA026

32MB
\$289
 DCDIA027

16MB OEM
\$215
 DCDIA028

Monster Sound MX300

Ultimate 3D Audio Experience!!

Want to annihilate your opponents every time? Diamond's Monster Sound MX300 gives you awesome combat tools: Aureal's latest A3D 2.0 positional audio, 4-speaker support and 64-voice hardware wavetable synthesis. Imagine playing your favourite PC game hearing footsteps from behind you and gun shots from overhead.

- Hardware A3D 2.0 acceleration
- 9.6 audio systems
- Features Dolby Digital (AC-3) support
- Advanced 320-voice wavetable with support for downloadable samples
- Supports DOS and Windows games



\$135
 MMMA011

Rio PMP300

The first portable MP3 music player that stores up to 60 minutes of digital quality sound. Load the latest songs on to Rio directly from your Hard Drive, personal CD's or the Internet and carry them with you. It's smaller than an audio cassette and has no moving parts, so it never skips. Powered by a single AA battery, Rio provides up to 12 hours of continuous music playback.

- Lightweight - only 70 grams
- Palm size for easy portability
- 32MB built-in flash memory

\$299
 MMMA012



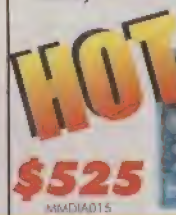
16MB Flash
 Memory Card
\$129
 MMMA014

Rio 500

Internet Music In the Palm of Your Hand!

The Rio 500 puts the power of digital audio in the palm of your hand! Rio 500 is skip-free, portable audio player that hold up to two hours of digital quality music and up to 32 hours of spoken audio content. Rio is the perfect companion for people on the go.

- 64MB built-in memory - Expandable to 96MB
- Back-lit LCD display with preset & custom EQ functions
- 13 hours continuous playback with single AA Battery



\$525
 MMMA015

32MB Flash
 Memory Card
\$199
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The Millennium G400 Series



A powerhouse of breakthrough technologies and next-generation features, the Millennium G400 Series of graphics boards are outfitted with Matrox's unique DualHead Display feature, built-in support for true Microsoft® DirectX™ 6 Environment-Mapped Bump Mapping and trademark Vibrant Color Quality² rendering. It is these unequaled, must-have features which not only distinguish them from all other graphics solutions, but which revolutionizes the way you use computers.

The Millennium G400

Fitted with 16 or 32MB of fixed, high-speed SGRAM, the Millennium G400 provides lightning fast, ultra-crisp displays with its 300 MHz RAMDAC, while at the same time delivering stunningly realistic image quality in the most demanding business and home applications without compromising performance.

G400 RETAIL
16MB
\$329
DCMAT053

G400 RETAIL
32MB
\$415
DCMAT054

G400 16MB
OEM
\$295
DCMAT056

G400 32MB
OEM
\$395
DCMAT057

The Millennium G400 MAX

The Millennium G400 MAX is fitted with a fixed 32MB of high-bandwidth SGRAM and is supercharged with a 360 MHz UltraSharp RAMDAC capable of driving high-end monitors at resolutions of up to 2048 x 1536, 32-bpp at 85Hz. Targeted directly at the accept-no-compromise PC gamer and at professionals who require an exceptionally large desktop display, the Millennium G400 MAX slams the performance gear into overdrive with an increase in raw speed of more than 30 per cent over the Millennium G400.

G400 MAX 32MB AGP \$485 DCMAT055

Sound Cards



Montego II QUADZILLA

The total 3D gaming experience!

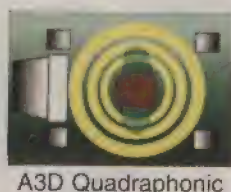
The gamer's choice for the best in 3D audio just got better. Introducing the new Montego II Quadzilla from Turtle Beach. Armed with the very latest Wavetracing™ technology, Quadzilla submerses you in the astounding 3D audio world of the hottest new games and websites with realistic three-dimensional audio images. And with stereo S/PDIF digital output, you get the best theater quality surround sound for your PC.

- A3D 2.0 positional audio with four speaker support and S/PDIF digital output
- High-quality audio performance with 97 dB signal-to-noise ratio
- 320 voice PCI wavetable synthesis
- Includes Voyetra Software Suite

Montego II

With advanced features such as high-speed bus-mastering scatter-gather PCI audio interface, DirectSound acceleration, 320 voice wavetable synthesis, A3D positional audio for realistic gaming effects, hardware-based, full-duplex record/playback at full bandwidth and 96 DMA channels, Montego II maximizes your multimedia experience by delivering state-of-the-art audio performance! Montego II also runs legacy DOS games,* so you can supercharge Windows audio without giving up DOS games compatibility

- High-resolution, 18-bit converters
- 10 Band Hardware Equalizer
- Greater than 97 dB signal to noise ratio
- Supports all of the latest PC audio standards
- Experience the thrill of Aureal A3D
- Internet-ready with enhanced stereo full-duplex audio



A3D Quadraphonic



\$325
MMTURG02



\$169
MMTURG04

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ACS22 TOWER SPEAKER SYSTEM

Powerful sound from a two tower system

Ideal for those consumers who need excellent PC audio output, either for teleconferencing, games or music CDs, but who do not have a requirement for a subwoofer. Excellent value for money.

- Small footprint with headphone output
- 5 Watts RMS Power
- Produces powerful audio output from two satellites

\$65

MMAL1008



ACS33 POWERCUBE SPEAKER

3-Piece system dramatically enhances PC Audio

The PowerCube Speaker system with its compact satellites delivers powerful audio playback from a 3-piece system. Active subwoofer can be set for desired bass response and the electronic controls on the satellites adjust the volume for both satellites and subwoofer simultaneously.

- 10 Watts Satellite Power
- Volume control and Power ON L.E.D
- 15 Watts Subwoofer Power

\$145

MMAL1005



ACS45.1 POWERCUBE SPEAKER

Proven Sonic Performance at an amazing price.

Introducing the Altec Lansing ACS45.1 PowerCube Speakers, a three piece multimedia audio solution at an unbelievable price. Experience the enhanced output of the PowerCube satellite system. Great for games and CD's, the ACS45.1 will bring hi-fi audio to your computer desktop today.

- 12 Watts Satellite Power
- 3" full range driver
- 20 Watts RMS
- 6" subwoofer

\$175

MMAL1011



ADA305 DIGITAL POWERCUBE

Digital Pro Logic Ready

The ADA305 Digital PowerCube delivers multidimensional audio excitement resulting from a Dolby Pro Logic decoder in the subwoofer. To deliver multichannel audio, the Digital PowerCube uses Altec Lansing's patented side-firing speakers to deliver true multidimensional audio.

- 20 Watts Satellite Power
- 2 x 3" full range drivers
- 6" Subwoofer
- USB ready
- Sub 20Watts RMS

\$365

MMAL1006



ACS54 POWERPLAY PLUS SPEAKER

5-Piece system designed especially for the sound demands of gamers. PowerPlay Plus is the only speaker system designed especially for gamers that provide high quality, powerful surround sound game audio output. This 5-piece system provide a true multidimensional surround sound experience

- 20 Watts Satellite Power
- 20 Watts Subwoofer Power
- Unique Bracket/stands provide convenient mounting possibilities for surround speaker

\$225

MMAL1009

HOT



ADA880 DOLBY DIGITAL

The ADA 880 combines 80 watts pure power, sophisticated electronic circuitry, and Altec Lansing's patented speaker technology to bring crisp, thunderous Dolby Digital audio to your desktop. The ADA 880 also features detachable rear surround speakers to create the ultimate surround sound environment available today.

- Automatically detects the signal source and output to either Dolby Digital, Dolby ProLogic, or Stereo
- Satellites can be placed near without disturbing images.
- Control of all audio functions at your fingertips

\$599

MMAL1010

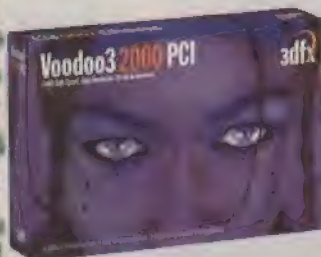


Graphics Cards

- 32 bit internal rendering
- full 128-bit 2D accelerator
- DVD hardware assist
- DirectX®, Glide® and OpenGL®

Built In
TV Output

3dfx



AGP OEM

\$225

DC3DF004

AGP

\$299

DC3DF010

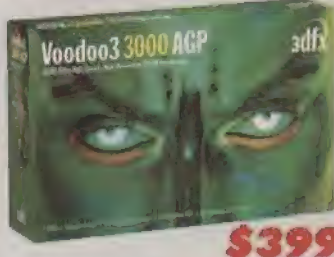
PCI

\$299

DC3DF001

Industry-Leading Performance

The 143MHz Voodoo3 2000 AGP and PCI boards are expected to generate up to 6 million triangles and 286 Megatexels per second at resolutions of up to 2,048 by 1,536 pixels. The Voodoo3 2000 boards will feature a 300MHz RAMDAC and 16MB of SDRAM.



\$399

DC3DF002

The 166MHz Voodoo3 3000 AGP board is expected to generate 7 million triangles and 333 Megatexels per second at resolutions of up to 2,048 by 1,536 pixels. Features a 350MHz RAMDAC, TV/S-Video Out capabilities as well as a game bundle featuring best-selling titles. The Voodoo3 3000 will also feature 16 MB of SDRAM.



\$599

DC3DF003

SPECIAL

The 183MHz Voodoo3 3500 AGP board is expected to deliver up to 8 million triangles and 366 Megatexels per second at resolutions of up to 2,048 by 1,536 pixels. It also includes 3Dfx's proprietary flat-panel support, LCDfx. Features Real-time MPEG-2 Video and Intelligent TV - Tuner and Digital VCR VisualReality™. Also features a 350MHz RAMDAC, TV/S-Video Out capabilities also a game bundle featuring best-selling titles with 16MB of SGRAM.

Adelong Computers

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Magic TNT2

The Magic TNT2 using the nVIDIA RIVA TNT2 chipset is the fastest and meanest gaming card on the market today. Featuring a 300Mhz RAMDAC, the Magic TNT2 supports resolutions up to 2048 x 1536 with ease. Loaded with 32MB of ultra quick SGRAM the Magic TNT2 offers complete support of 3D textures and is optimized for Pentium III and AMD 3DNow systems.



32Mb AGP
\$265
DCMAG0012



Magic TNT2 M64

The Magic M64 utilising the nVIDIA TNT2 128-bit chipset features award winning performance at a competitive price. Featuring 32MB of SDRAM and a 300Mhz RAMDAC for crystal clear resolution, the M64 is ideal for graphics, hardcore gaming and watching DVD action in full screen mode.



\$195
DCMAG0020

Magic 3D Banshee

The Magic TwinPower incorporating the latest 3DFX Voodoo Banshee chipset is one of the fastest and most amazingly fast 2D/3D Graphics Accelerator on the market today. Play games at up to 60 fps and run high resolution games/ applications at up to 1600 x 1200 with hardware acceleration

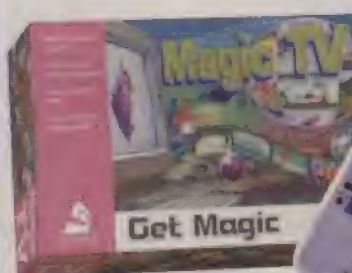


- 128-bit combined 2D/3D Voodoo Banshee chipset
- 16MB Memory with 125Mhz SGRAM
- Supports Glide, OpenGL, DirectX, Direct3D
- NT 4.0 & Windows 95/98 compatible

PCI AGP
\$159 \$159
DCMAG0011 DCMAG0007

Magic TV

Watch full screen TV on your PC with the FlyVideo TV Card. Capture live video & images from your VCR or Camcorder, or use a CCD Camera and video-conference over a LAN or Internet. Teletext included with FM radio.



TV Card/Remote/FM Radio
\$135
MMWAG002

Magic Toplan

Toplan is a USB to USB Host connector allowing two or more computers to share programs, files and peripherals such as printers with ease. Multiple network nodes supported to a super-fast 12Mbps under Network Neighborhood in Windows 98. Simple PnP installation ideal for multi-player gamers & those with more than one computer. Pack includes a Toplan Host and 2 x 5m USB cables.



\$125
NWMAG000

Magic Link



Simple, portable and fast link for transferring files between 2 USB-enabled computers. A must for notebook & mobile users. Software & 6ft cable included.

\$55
NWMAG001

Magic Theater Pro

Magic Theater Pro 5.1 Channel system will deliver Hi-Fi and true Dolby Digital AC-3 sound on your PC with today's games and movie titles. Comes complete with a Magic Sound Live! PCI soundcard and a speaker system consisting of a subwoofer, 4 satellites and a center channel delivering a total of 47 Watts RMS.



\$379
MMWAG003



Magic TrueSound

Magic TrueSound brings together requirements demanded by musicians, gamers and midi players. Allowing them to enjoy the high quality environmental sound. Featuring the JRC TrueSurround 3D audio processor. It produces exceptional sound experience from multi-channel audio such as Dolby Digital through only two speakers.



\$65
MMWAG004

Sales staff are available test!
9am-6pm Monday to Friday,
10am-4pm Saturday

Technical Support
(5 Days a week 9am-6pm)
Phone (02) 8344 3160

Sales Hotline 02 8344 3190

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Adelony Computers

DFE-905 Network Kit

Includes everything you need to set up a network. Includes 2 PCI 10/100 Ethernet cards, 4 Port Dual Speed Hub and 2 x 6 meter Cat5 network cables. Ready made for Small and Home offices.



\$295

NWDLI033

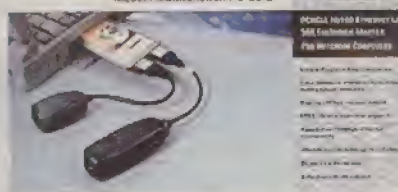


DFE-660TX 10/100Mbps PCMCIA Card

The DFE-660TX adapter is engineered to unleash power of today's notebooks and turn them into robust stations or servers. Features the advanced 32-bit Cardbus interface, explosive 10/100Mbps Full/Half Duplex performance and RJ-45 connection.



D-Link DMF-560TX 10/100 Ethernet LAN + 56K Fax Modem Multifunction PC Card



PC MAGAZINE EDITORS' CHOICE

\$165

NWDLI043

Ethernet and Fast Ethernet Adapters

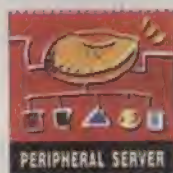
Code	Model	Bus	Speed	Price
NWDLI000	DE-220PCT	ISA	10Mbps	\$35
NWDLI001	DE-528CT	PCI	10Mbps	\$39
NWDLI002	DE-530TX	PCI	10/100Mbps	\$55
NWDLI026	DE-500TX	PCI	10/100Mbps	\$85
NWDLI040	DFE-570TX	PCI	4 x 10/100Mbps	\$595

PCMCIA Fax/Ethernet Cards and Fax/Modems

Code	Model	Description	Price
NWDLI003	DE-660CT	10Mbps PCMCIA Ethernet Card	\$105
NWDLI044	DMF-560TXD	10/100Mbps + 56K V.90 PCMCIA Card	\$395
FMDLI003	DM-560	56K V.90 & Flex PCMCIA Card/Modem	\$165
FMDLI001	DFM-560E	56K V.90 & Flex External Fax/Modem	\$129
FMDLI000	DFM-560I	56K V.90 & Internal Fax/Modem	\$85

DP-802 Internet and Print Server

This device allows the entire workgroup to access the Internet through 1 ISP account, and then print any documents to a shared network printer. Features 1 Parallel port, 1 x 10/100Mbps LAN port and 56K modem/128Kbps ISDN TA support.



\$580

NWDLI034

Internet Servers

Code	Model	Ports	Network Port	Price
NWDLI024	DP-602	2x Serial Port	10/100Mbps	\$485
NWDLI046	DP-601M	1 x 56K V.90 Modem Port	10/100Mbps	\$525
NWDLI047	DP-692	2 x Serial Port + Uplink	9 X 10Mbps	\$565

Print Server

NWDLI015	DP-300	2x Parallel, 1 x Serial	10/100Mbps	\$435
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Switches

Code	Model	Ports	10Mbps	100Mbps	Price
NWDLI021	DES-815	15	12	3	\$875
NWDLI022	DES-1008	8	✓	✓	\$610
NWDLI032	DES-1016	16	✓	✓	\$1215
NWDLI035	DES-1024	24	✓	✓	\$1745

DU-H4 4 Port USB Hub

These USB Hubs allow you to connect up to 4 USB peripherals for use with a single PC.



NEW

\$75

NWDLI037

DU-H3SP 3 Port USB with 1 x Serial, 1 x Parallel

Multipurpose device allows connection of up to 3 USB peripherals, 1 serial device and 1 parallel port device such as a printers and modems.

\$169

NWDLI038



Hubs

Code	Model	Ports (RJ45)	Speed	Price
NWDLI017	DE-805TP	5	10Mbps	\$89
NWDLI004	DE-809TC	8	10Mbps	\$105
NWDLI042	DE-816TP	16	10Mbps	\$279
NWDLI030	DE-824TP	24	10Mbps	\$459

Dual Speed Hubs

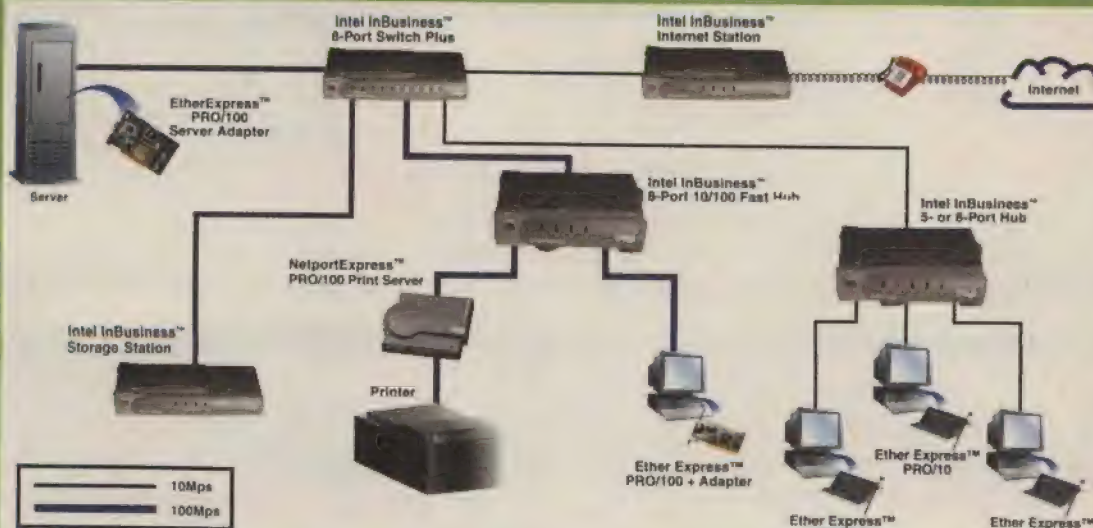
Code	Model	Ports (RJ45)	Speed	Price
NWDLI045	DFE-905DX	5	10/100Mbps	\$240
NWDLI012	DFE-908DX	8	10/100Mbps	\$355
NWDLI014	DFE-916DX	16	10/100Mbps	\$855
NWDLI020	DFE-2624X	24	10/100Mbps	\$1335

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intel InBusiness™ Small Business Networking Products



Ethernet PCI Adapters

For customers who want basic, high speed connectivity, the Intel® PRO/100+ provides peak performance and Adaptive Technology to optimise network performance. 10/100M auto-negotiation automatically connects at the highest speed for maximum performance.



Server Adaptor
\$189
NWINT016

Management Adaptor
\$149
NWINT015

InBusiness™ Switch

The Intel® InBusiness™ 8-Port 10/100 Switch is perfect for improving the performance of your network using standard or Fast Ethernet. Designed to give users high-speed performance at an affordable price.

- Plug & Play Installation
- Auto sensing ports automatically detect speed of connected device.
- Switching provides each user or hub a direct channel to network devices



\$575
NWINT014

InBusiness™ Hubs

Intel® InBusiness™ Hubs are designed so you can easily create your own small network or expand an existing network in minutes. Designed to be small enough for the desktop, they are the perfect solution for sharing devices and other resources.

- Simply Plug & Play Installation
- Crossover port allows you to connect to other Hubs
- Choice to 10 or 100Mbps RJ-45 Ethernet Connectivity



Code	Model	Speed	Price
NWINT008	5-port	10Mbps	\$99
NWINT009	8-port	10Mbps	\$119
NWINT010	4-port	100Mbps	\$190
NWINT011	8-port	100Mbps	\$365
NWINT012	8-port	10/100 Auto	\$425

InBusiness™ Print Station

The Intel® InBusiness™ Print Station is the easy way to share printers over a network. Set-up is so simple that within minutes your small business can be printing to shared printers over a 10 or 100Mbps network. Now you can locate up to 2 printers anywhere on your network independent of PCs with a single Print Station.

- 10 or 100Mbps Ethernet Connection
- Supports 2 Parallel Printers
- No configuration hassles with simple installation wizard



\$315
NWINT007

InBusiness™ Internet Station 56K

The Intel® InBusiness™ Internet Station 56K is the ideal way to connect your small office to the Internet. Cost-effectively share one analog phone line, and one Internet account over the network. Easily combine multiple analog connections and line to increase your Internet access speed up to two times current analog speed. The Intel InBusiness Station 56K is part of a complete line of networking products designed specifically for small business.

- 2 x RJ-11 Phone Ports, 9-Pin Serial Port
- 4 x 10Base-T Ethernet Ports
- Supports TCP/IP, DNS, DHCP, CHAP, HTTP
- Built in 56K Modem
- Includes browser based setup software



\$595
NWINT018

InBusiness™ Storage Station

The InBusiness™ Storage Station lets your office share files over the network, and includes PC backup software for data protection. Simple installation and setup make it the easiest way to provide shared storage for your employees by simply dragging and dropping files on a central drive.

- 10 or 100Mbps Ethernet Connectors
- Supports TCP, DHCP, FTP, HTTP, SMB
- Includes Client installer CD software



12GB
\$1815
NWINT004

24GB
\$2645
NWINT005

Microsoft IntelliMouse Explorer

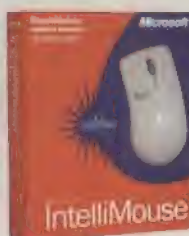


Point and click with pinpoint accuracy-literally! The new IntelliMouse Explorer from Microsoft is so advanced, it doesn't need a mechanical ball as it's been replaced with the new IntelliEye optical sensor, which provides consistent accuracy and control on virtually any surface.

- Features 2 additional, customizable buttons
- Includes the IntelliMouse scrolling wheel

\$95 (ICM5T012)

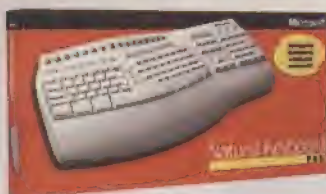
Microsoft IntelliMouse IntelliEye



The IntelliMouse with IntelliEye gives you superior precision with its revolutionary optical sensor that scans your desktop 1,500 times a second. It works on virtually any surface-so no mouse pad or roller-ball cleaning is required. The IntelliMouse with IntelliEye also features an ergonomic design and a wheel for efficient zooming and scrolling.

\$75 (ICM5T013)

Microsoft Natural Keyboard Pro



The new ergonomic Microsoft® Natural® Keyboard Pro features 19 "Hot Keys," which link directly to applications on your PC and the web. Plug in up to 2 USB devices directly into your keyboard.

\$109 (ICM5T014)

Microsoft Internet Keyboard



Includes 10 hot keys on a comfortable design that also features a detachable palmrest for added comfort. Hot Keys allow instant access to email and internet functions.

\$55 (ICM5T015)

Microsoft SideWinder Dual Strike

Dual Strike integrates the directional control of a keyboard, the precision of a mouse, the fun and excitement of a joystick, and the comfort of a game pad-all in one single and versatile handheld unit. Dual Strike device controls functions like running, dodging, side-stepping as well as aiming, navigation, and coordinating difficult moves like strafing and circle strafing. USB Port required

\$89 (ICM5T016)

Microsoft Precision Racing Wheel

The Precision Racing Wheel includes a compact, yet rugged, state-of-the-art PC steering wheel, an easy-to-release clamp, and sturdy, non-slip pedals. The Precision Racing Wheel also features 8 buttons, including 2 shifters/triggers, which you can program and customize for your own driving preference

\$149 (ICM5T017)

Camera/Speakers

QuickCam™ Express

Make face to face online meetings a reality over the Internet. Snap and send photos and video-emails with the ease.

- 24 bit colour
- 352 x 288 resolution at 16fps

\$95 (ICLQCG02)



SoundMan® G1

These speakers handle sound across the full sound spectrum to add high-quality, realistic audio to your multi-media computer, portable CD player, or TV. Just plug the speakers in and start listening. Full volume and bass controls and headphone jack.

- 8 Watts RMS Power
- Frequency: 55Hz - 18KHz

\$69 (MMCG000)



SoundMan® X1

From soaring high notes to deep bass, you'll experience the full, complex richness of your favorite music and crisp, clear sound whether you're down-loading from the Internet, getting into MP3 audio, or listening to your favorite CD.

- 25 Watts RMS Power
- Frequency: 38Hz - 20KHz

\$125 (MMCG001)



SoundMan® X2

Experience theater-quality audio that captures crisp, clear highs & deep, rich bass. Enjoy the full, high-definition sound spectrum and add ultra-realistic, high fidelity sound to any multimedia computer

- 40 Watts RMS Power
- Frequency: 30Hz - 20KHz

\$175 (MMCG002)



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Let Swann cater to all your modem needs.

Whether you use it for gaming, email, working or online transactions we have the modem just for you



net SLIDER 56K V.90

The faster your modem, the faster your commands are received and processed by an on-line server, putting you ahead of your on-line competition. The Swann Netslider's ISO 9901 Rockwell chipset guarantees to deliver exceptionally stable as well as fast data transmission. Finally a modem that is catered just for gamers.



\$179 FM5WA005

FREE GAMER WEBWORKS
VALUE \$49.95

Swann Smart 56K



Simplicity and stability are what made this modem win a 'best buy' award against 17 leading-brand modems tested. The Swann Smart 56K External Modem's clever upright design, not only takes up less desk space, but defies heat, the enemy of all modems. Perfect for the family and new computer user and those new to the internet.

BONUS OFFICE WEBWORKS

Internal **\$89** FM5WA001
External **\$179** FM5WA000

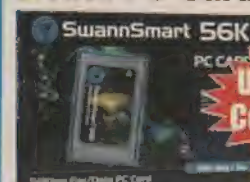
Speed Demon 56K

Red hot and roaring to go! The Speed Demon 56K modem offers blinding speed and reliability. With dual chip v.90/k56 Flex technology. It's fax, data and voice compatible. Simple to install and easy to use, this modem will take you on the w...w...wildest ride.

\$129 FM5WA004



Swann Smart 56K Global PC Card



Use in 27 Countries

SwannSmart International 56K modem cards lets you travel virtually anywhere in the world with your notebook or Palm™ personal assistant and never lose touch. In fact all your usual business and personal communication tasks need never be curtailed, just because you're overseas.

\$169 FM5WA002

U.S. Robotics

3Com 56K Faxmodem



56K Fax modem gives users faster downloads for a more exciting, rewarding online experience. U.S. Robotics were the first V.90-compliant modem brand available. So U.S. Robotics modem users can get all the Internet they want from any service provider offering either V.90 or x2 technology. These modems are software upgradeable so with just a few clicks brings new features.

\$179 FM5RC014

3Com 56K Message Modem Pro

All the features of a top brand Voice/Fax Modem and more. This unit allows superfaster internet access with either V90 or X2 systems. Experience office quality full duplex hands free speakerphone with this modem, even feature Caller ID too. You can even store voice/fax messages when you PC is switched off.

\$275 FM5RC012



NetComm

Netcomm Roadster II Ultra 56K

This modem features Simultaneous Voice Data, which means you can send data and voice through the one line. Great for gamers as well as the business user, this modem features V90 as well as K56 flex protocols. Comes in either the new advanced USB interface or the traditional serial interface.



INCLUDES WINFAX PRO 8.0

USB **\$235** FM5RC015
Serial **\$235** FM5RC017

Netcomm Smartmodem 56K

This is the top of the range modem from Netcomm. If you require unparalleled performance from your modem, this is the unit for you. It features the Rockwell chipset, complies to V90 and K56 flex standards. This modem also features 16bit technology as well as advanced encryption technology i.e. DES encryption and SuperSecure. This advanced business modem has no competitors.



\$515 FM5RC018

Modems

Modems

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AUSTRALIA

Modems/Multimedia

Dynalink 56k External Modem

- V.90 / K56flex dual-mode for high Internet compatibility
- Plug 'n play, plus friendly QuickGuide for easy installation
- Send and Receive faxes with high speed and clarity from your PC.
- FaxStream DUET, Caller ID, Voice Mail, Handsfree Speakerphone Mode
- Free-call Tech Support

VoiceDesk56 Pro External **\$145** FMDYN001

"Good value for money... ease of setup and use is excellent... consistently connects at high speeds"
Australian PC World, Nov 1999.



5 YEAR WARRANTY

Dynalink

With all Dynalink modems:

6 MONTHS FREE INTERNET ACCESS With TPG

PLUS: ValuePack software offer: iPhone 5 FREE, Norton Utilities 3 \$20, Compton's Infopedia \$15, Quake II \$10 with your purchase of any Dynalink product.

60 MONTHS OF FREE INTERNET ACCESS WITH TPG IS AVAILABLE IN: SYDNEY, PERTH, KILMARNOCK, TOWNSVILLE, LAKE MACQUARIE, MELBOURNE, BRISBANE, SOUTHPORT, CANNES, ADELAIDE, PERTH, HOBART, LAUNCESTON AND DARWIN. ONE OFF \$30.00 CONNECTION FEE, \$0.00MB DOWNLOAD LIMIT PER MONTH. UNLIMITED 3 HOUR CONNECTIONS. OFFER AVAILABLE FOR A LIMITED TIME.

Dynalink Internal ISA or PCI ISA has all the features of our external.

PCI:

- PnP installation
- Telephone Answering Machine Mode
- V.90 / K56flex dual-mode for high Internet compatibility
- Send and Receive faxes with high speed and clarity from your PC.
- Free-call Tech Support
- 1 Year warranty on PCI

VoiceCard56 ISA **\$129** FMDYN000



PCI Card56 **\$85** FMDYN005

5 YEAR WARRANTY ON ISA

Dynalink PCMCIA (PC Card) Modem

PCMCIA PC-CARD MODEM

- PnP installation
- V.90 / K56flex dual-mode for high Internet compatibility
- Send and Receive faxes with high speed and clarity from your PC
- Free-call Tech Support

5 YEAR WARRANTY



\$179 FMDYN003

Dynalink Magic TVview

TVVIEW TV/FM TUNER VIDEO CAPTURE CARD

- Fully Featured, including Teletext and Remote Control & Optional FM Tuner

- Resizable window, right up to full-screen (640x480), using the Remote Control.

- Capture incoming video from a VCR, digital camera or CamCorder, then edit the captured digital data.

ALSO AVAILABLE: USB DEVICES AND 3D GRAPHIC ACCELERATORS

\$129 MMDYN001



For more information on any of Dynalink's products, please visit www.dynalink.com.au or FreeCall 1800-357-653

Adelong Computers

Monitors

FLATRON 17" 795FT plus



USB

Triple Free

- Eye Strain Free
- Distortion Free
- Tension Wire Free

Built in 4 port USB Hub

Type: 17" (16.01" viewable)
Dot Pitch: 0.24mm Stripe Pitch
Max Resolution: 1600 x 1200/ 75Hz
V-Frequency: 50-160Hz
Communication: DDC1 /2 with OSD
Certifications: MPR-II, TCO-99, EPA, CE

Unlike conventional flat CRTs, LG Flatron is completely 100% Flat, showing you images with enhanced color purity. Superior high resolution and innovative W-ARAS coating means less eye-fatigue due to reduced emissions and reflections.

\$885 MOLGS000

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Studioworks

15.1" LCD 500LC

Think Flat



Flat does working good. Slim does looking cool.



Type	15.1" TFT
Pixel Pitch	0.3mm
Max Resolution	1024 x 768/ 75Hz
V-Frequency	50-160Hz
Communication	DDC2 with OSD
Certifications	MPR-II, TCO-99, EPA, CE

If you think you can never be too rich or too thin, then the 500LC from LG is for you. With its rich, brilliant display and slim, elegant contours this TFT-LCD has a wide viewing angle, and multi-synchronous support up to 1024 X 768 @ 75Hz. What's more, all supported resolutions are shown at full screen size, automatically. The 500LC from LG. Enjoy the view.

\$2225 MOLGS001

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AUSTRALIA WIDE 3 YEAR ON SITE WARRANTY*

NEW RANGE OF MITSUBISHI MONITORS

Mitsubishi Diamond View 1554i 15"

- 15" Monitor ideal for home users
- Dynamic Focus picture tube
- 13.9" Viewable, 0.28 dot pitch
- Max Resolution 1024 x 768 @65Hz
- Weighs 13kg

\$295 MCMIT009



Mitsubishi Diamond View 1570 15"

- 15" Monitor ideal for SOHOs
- Dynamic Focus picture tube
- 13.9" Viewable, 0.28mm dot pitch
- Max Resolution 1280 x 1024 @60Hz
- Weighs 13kg with OSD

\$345 MCMIT010



Mitsubishi Diamond View 1770e 17"

- 17" Monitor for casual users
- High Contrast CRT
- 15.9" Viewable, 0.27mm dot pitch
- Max Resolution 1280 x 1024 @60Hz
- Weighs 18kg with OSD

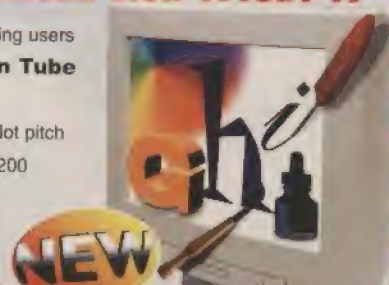
\$495 MCMIT012



Mitsubishi Diamond View 1795DT 17"

- 17" Monitor for demanding users
- Flat, Diamondtron Tube
- Aperture Grille
- 16" Viewable, 0.25mm dot pitch
- Max Resolution 1600x1200 @ 75Hz
- Weighs 23kg with OSD

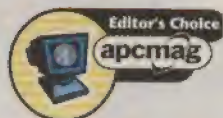
\$775 MCMIT013



Mitsubishi Diamond View 1995 19"

- 19" Monitor for professionals
- 18" Viewable, 0.26mm dot pitch
- Max Resolution 1600 x 1200 @75Hz
- Weighs 24kg with OSD
- BNC & 15Pin Input

\$1149 MCMIT005



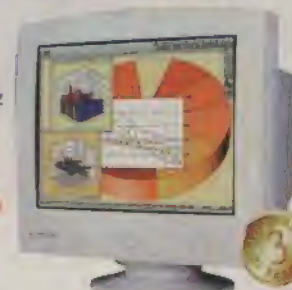
"the only 19" to equal & better Sony in our tests"
APC MAGAZINE APRIL 1999

Mitsubishi Diamond View 2107 21"

- 21" Monitor for professionals
- 20" Viewable, 0.26mm dot pitch
- Max Resolution 1600 x 1200 @85Hz
- Weighs 30kg with OSD
- BNC & 15Pin Input

\$1925 MCMIT006

VALUE



"Compared to the Sony Trinitron, the Diamond View scored equal to, or better than in every regard, apart from brightness"
APC MAGAZINE APRIL 1999

* Terms & Conditions Apply

MITSUBISHI CD-ROM DRIVES

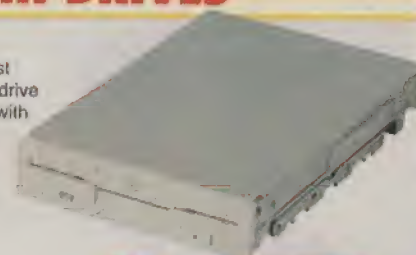


DIAMOND DATA CD-ROM drives are Multi Read Compliant, support Ultra DMA data transfers and employ advanced Constant Angular/Linear Velocity for improved reads and transfers.

Code	Model	Price
MMMIT001	40x EIDE CD-ROM	\$79
MMMIT005	50X EIDE CD-ROM	\$99

MITSUBISHI DRIVES

Mitsubishi offers the latest innovation in floppy disk drive technology, the LS-120, with 120 megabyte capacity. The LS-120 is also compatible with older 1.44 MB disc.



Code	Model	Price
BUMIT000	Mitsubishi LS-120	\$149
BUMIT001	120MB capacity diskettes	\$25

3.5" 1.44MB
Floppy Drive \$25
FDMIT000

Sales staff are available (est)
9am-6pm Monday to Friday,
10am-4pm Saturday

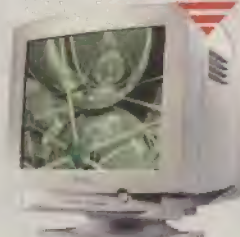
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(5 Days a week 9am-6pm)
Phone (02) 8344 3160

Sales Hotline 02 8344 3190

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Adelong Computers

Model	15"DD-556BA	17"DC-770BA	17"DE-770FA	19" DA-995
Screen Size	13.8" Viewable	16" Viewable	16" Viewable	18"Viewable
Dot Pitch	0.28mm	0.27mm	0.25mm	0.25mm
Max Resolution	1024x768 N/I	1280 x 1024 N/I	1280 x 1024 N/I	1600 x 1200 N/I
User Control	OSD	OSD	OSD	OSD
Price	\$275 MOVID003	\$425 MOVID000	\$485 MOVID002	\$875 MOVID001
3 YEAR ON SITE WARRANTY*				
QUEENSLAND, NSW, VICTORIA ONLY				
CE				



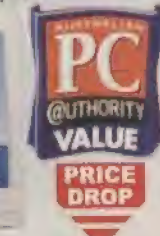
Monitors/CD-R

PanaSync S110

Combining value with high quality imaging, the PanaSync S110 is an excellent buy for a 21" monitor. It has all the features expected in a high end monitor all at a very reasonable price. If you are looking for good value uncompromised monitor performance then the PanaSync S110 is perfect for you.



21" CRT, 20" viewable
0.25mm dot pitch
1600x1280 @ 71Hz



\$1795
MOPAN001

PanaSync SL

The PanaSync SL range of monitors feature the unique Short Length Technology. This technology give a PanaSync SL 17" monitor the depth of a normal 14" monitor and the 19" PanaSync SL the depth of a 15". The shorter depth of the ZenTan™ CRT reduces the distance between electron beam gun and the screen's phosphor surface thus enhancing picture quality.



PanaSync SL75

17" CRT, 16" viewable
0.27mm dot pitch
1280x1024 @ 66Hz

\$715
MOPAN015

PanaSync SL90i

19" CRT, 18" viewable
0.25mm dot pitch
1600x1200 @ 75Hz

\$1245
MOPAN011

Panasonic

CD-Recording Kit

Want no frills high speed SCSI recording performance then look further than this bundle. It includes the new 8x record, 20x read internal SCSI drive, a PCI SCSI card and recording software. Panasonic reliability and 8x recording performance but only at a 4x price.

\$625
MMPAN002

Drive only
\$519
MMPAN008

NEW



CD-ROM/CD-RW Drives

Delta 44x CD-ROM Drive



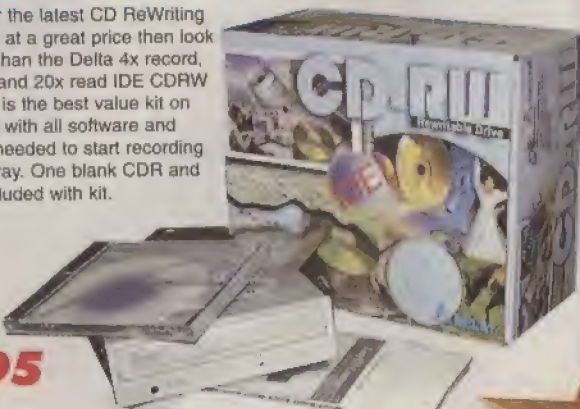
One of the fastest and most reliable CD-ROM drives on the market. This new range of IDE CD drives from Delta represent the best value for money. Supports reading of CD-R, CD-RW and other media.

\$75
MMADEL001

Delta CD-RW Drive 4x4x20

Looking for the latest CD ReWriting technology at a great price then look no further than the Delta 4x record, 4x rewrite and 20x read IDE CDRW drive. This is the best value kit on the market with all software and hardware needed to start recording straight away. One blank CDR and CDRW included with kit.

\$395
MMADEL001



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e-mail: info@adelong.com.au

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Sydney NSW 2000
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Fax: (02) 9267 5042

Verbatim.

CD-RW/CD-R

Signature II CD Colour Printer

The Signature II CD Colour Printer from Verbatim and Primera makes CD-R labelling easy. With Signature II's high-resolution printing, you can add crisp, colourful text, logos, graphics and photos to your CD-Rs dpi resolution.



\$1745 MMVER006

NEW

Smart and Friendly

CD Racer

Double Speed
CD-Recorder
with CD-RW
ReWritability

CD Racer Internal is a 2x writer, 2x rewrite, 24x playback CD-Recorder. Includes free software worth \$699, the Racer is a low cost CD recorder solution that brings you new levels of performance and technology



\$395 MMVER003

Prelude! 1-2-1

CD Duplicator

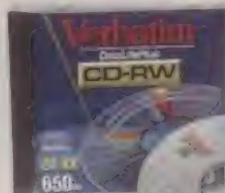
Discover just how easy it is to make your own CDs with the touch of a button! Verbatim Prelude! 121 Duplicating System is the perfect way to duplicate and distribute CD's. Place an original CD in the 32x CD reader drive, followed by a recordable CD in the 4x CD recorder drive after the system has read the contents. Press the button and presto! You've got a true copy without having to turn on your computer in less than 20 minutes!



\$2375 MMVER005

CD-R Disks

Pack of 10 **\$29** MMVER000

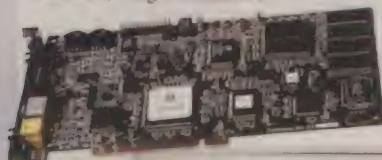


CD-RW

\$15 MMVER004

DVD-ROM Upgrade Kit

DVD entertainment is now affordable with the Hitachi dual speed DVD-ROM Drive and Cinemaster MPEG Decoder Card, bringing the movies to your PC screen. Includes several DVD titles - Muppet Treasure Island, Spycraft, Daedalus Encounter, Wing Commander IV



\$295 MMVER111

DVD-RAM Kit

Have up to 5.2GB of rewritable storage capacity at your fingertips with the latest in DVD-RAM technology. Features 1 x DVD-RAM Write and Erase, 2 x DVD-ROM/RAM playback and 8 x CDROM playback speeds in a SCSI Internal model. In addition is a bundled MPEG-2 Cinemaster DVD playback card.



\$1725 MMVER101

Code	Model	Price
MMVER012	2.6GB Disk	\$75
MMVER013	5.2GB Disk	\$109

HOT

20x PCMCIA CD-ROM Drives

Connect a 20X CD-ROM Drive to your notebook PC today via the PCMCIA port. The slim-line tray design reduces the size of the unit making it portably and lightweight.



\$285 MMVER008

CD Pocket RW 4420

The Smart and Friendly CD Pocket RW from Verbatim is a truly portable 4X Write, 4X ReWrite and 20X Playback CD Recorder with a 2MB Buffer. Weighing just 500 grams, the CD Pocket RW is designed specifically for portability.

Rechargeable battery pack is designed to write up to 6 CD's at 4X Speed without recharging. Comes with software and a PCMCIA host adaptor.



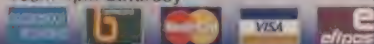
\$1325 MMVER009

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Adelony Computers

Zip 250 USB

All the benefits of the Zip 250 plus all the advanced features of the USB technology. True hot plugging technology and super fast USB connection. The new drive is compatible with both Windows and Macintosh, it also features a compact ultra thin case.

NEW**\$345**
BUIOM010

Zip 250

zip**250**

SuperFloppy Preferred By Millions

The new drive comes in two flavors: parallel port (for PC's) and SCSI (for Mac's or PC's with a SCSI connection). Zip 250 SCSI drive users will benefit from a performance boost, up to 56 times faster than standard floppy drives and 1.4 times faster than external CD-ROM drives. Best of all, current Zip 100 drive users need not worry about their investment in 100MB Zip using 250MB media).

- 50% faster than the original Zip 100 drive.
- Large 250Mb Capacity
- Compatible with 100Mb Zip Disk
- Proven Reliability

**\$299**
BUIOM011**\$299**
BUIOM012

Klik! PC Card

klik!**40**

This new Klik!™ drive is the size of a PC Card. Just slide it into your PCMCIA slot and have the benefits of super fast

40Mb storage that the Klik technology provides. Perfect for your digital pictures or large multimedia files.

\$380
BUIOM041**NEW**

Klik!

klik!**40**

Klik!™ drive can store 40Mb of data on a Klik! Disk. The Click Drive not only reads your Klik! Disk but also your Compact Flash

and Smartmedia cards. The Mobile Klik! Drive connects to your printer port using a pass through technology and can run on rechargeable batteries for mobile applications. There is even a Type II PC Card that will connect your Klik! Drive up to your notebook. (Click Drive Plus)

BUIOM035
BUIOM036Click Drive Ext.
Click Drive Plus**\$455**
\$535

Zip Drives

Increase your storage quickly, easily and economically - as you need it. With a 100MB Zip Drive you can take your data anywhere at anytime. Each disk stores 100MB of data and you can add them, as your needs grow. Available in Parallel, SCSI, Internal IDE and the new USB interface. You also get Zip tools on CD.

\$135
BUIOM007**\$199**

Drives

BUIOM000 100MB EXT PARALLEL ZIP Drive
BUIOM026 100MB USB ZIP Drive

\$190
\$240

Jaz 2GB Drive

jaz**2GB**

The new Jaz Drives hold a whopping 2GB of data per disk. Best of all these drives are fast and backwards compatible with the industry standard 1GB disk. Stream &

capture video, backup data and store images are just some of the applications that the Jaz Drive can be used for. SCSI Card needed.

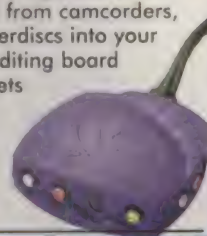
\$645
BUIOM017**\$645**
BUIOM018

Iomega Buz

buz

All the hardware and software you need to be a video genius Introducing the Iomega Buz-the easiest way to get multimedia from camcorders, DVD, CD-Roms, VCRs and laserdiscs into your PC! It's a video capture and editing board

combined with an Ultra SCSI controller that lets you capture Multimedia (fullmotion) video, sounds, digital pictures, music) into a PC

\$349
BUIOM023**\$525**
BUIOM027

Accessories for Zip

BUIOM012 100MB PC ZIP Disk **\$24**
BUIOM005 100MB PC ZIP Disk (3 Pack) **\$63**
BUIOM006 100MB PC ZIP Disk (10 Pack) **\$190**
BUIOM022 ZIP Card, PCMCIA to SCSI **\$185**

**\$24**
BUIOM012

Accessories for Jaz

BUIOM024 JAZ 2GB Disk **\$195**
BUIOM025 JAZ 2GB Disk (3 Pack) **\$559**
BUIOM031 JAZ PCMCIA to SCSI Converter **\$215**
BUIOM013 JAZ Traveller, SCSI to Parallel **\$85**

**\$179**

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Storage Drives

ORB™

2.2GB

INTERNAL AND EXTERNAL

Size. Speed. For everyone.
Easy to install Unlimited Capacity
Infinitely Rewritable

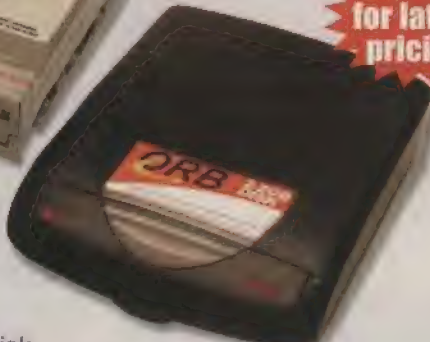
Look at the power ORB delivers!

- 3.5 hours of audio
- 2+ hours of video
- 2,000+ colour photographs
- 22 100MB floppy disks
- EIDE or Parallel Port versions
- 1500+ 1.44MB floppy disks
- 3+ CD ROM games

Call for latest pricing



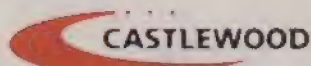
EIDE Drive
RRP **\$399**
BU-ORB000



2.2 GB Disk
RRP **\$79**
BU-ORB005

BUORB000
BUORB001
BUORB005

2.2Gb Internal EIDE ORB Drive **\$399**
2.2Gb External Parallel ORB Drive **\$449**
2.2Gb ORB Disk **\$79**



RICOH

CD-RW Drives

When every second counts....

Accelerated in every way. The birth of a new high-speed CD-R/RW Drive.

CD-R/RW Drive

MP7060 Series



Fastest CDRW Drive Around

Horizontal & Vertical installation possible.

Write CD-R **6x** ReWrite CD-RW **4x** Read **24x**

BUFFER MEMORY 2MB
WRITING/READING SPEED Writing: 6x (CD-R), 4x (CD-RW)
AVERAGE ACCESS TIME Reading: Max. 24x (CAV)
INSTALLATION Less than 120msec. (24x)
Vertical with eject button on top/Horizontal

The MP7060 Series offers further advances in reading/write speed. Ricoh's MP7060 Series CD-R/RW drives feature 6x CD-R recording speed, 4x CD-RW rewriting speed, and up to 24x CD-ROM/CD-RW disc reading speed. High-speed access makes CD-RW the ideal medium for daily data backup.

EIDE
\$595
MMRIC007

SCSI
\$665
MMRIC008

FORMATTED MEDIA
Ricoh (1x4x)CD-RW
Disc 74 Mins 650Mb
\$19 MMRIC003



Ricoh
CD-R Disc 74
Mins 650Mb
\$3 MMRIC004



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Adelong Computers

Printers

EPSON

A4 Colour Inkjet

Value

Stylus Colour 460

- A Windows only printer, the EPSON STYLUS COLOR 460 is ideal for first time users, students and families experimenting with colour.
- 4ppm Black/2.5ppm Colour
- 720 x 720 DPI

\$235

PREPS028



Home User

Stylus Colour 660

- Perfect Photo Quality printer for desktop publishing at home. It features true 1440 x 720 dpi resolution.
- 5ppm Black/3.5ppm Colour
- 1440 X 720DPI

\$305

PREPS029



Solo

Stylus Colour 760

- Delivers a precisely controlled ink droplets - the result is greater detail and smoother halftones. It's PC and Mac compatible and offers USB connectivity.
- 7ppm Black/6.8ppm Colour
- 1440 X 720DPI

\$510

PREPS030



Specialist Printers

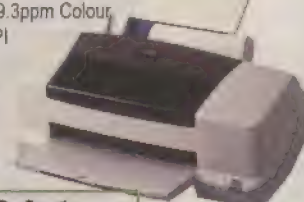
Professional

Stylus Photo 860

- The EPSON STYLUS COLOR 860 is a revolutionary new printer targeted at business and professional graphics users wanting maximum colour output combined with speed and affordability.
- 9.5ppm Black/9.3ppm Colour
- 1440 x 720 DPI

\$615

PREPS031



Office Colour

Stylus Colour 900

- It also offers flexible connectivity, Serial, USB, Parallel and optional ethernet. The combination of printing technologies ensure it is a high-speed, high-image quality printer.
- 12ppm Black/11.7ppm Colour
- 1440 X 720DPI

\$779

PREPS024



Over Size Colour

Stylus Colour 1160

- The new EPSON STYLUS COLOR 1160 is a revolutionary printer targeted at business and professional graphics users wanting maximum colour output combined with speed and affordability and the versatility of printing larger than A3. USB and Parallel interfaces.
- 9.5ppm Black/9.2ppm Colour
- 1440 x 720 DPI

\$Call

PREPS032

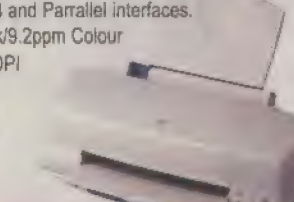


Photo Printers

Photo Colour

Stylus Photo 700

- Industry-leading 1440 dpi resolution this new printer offers the highest image quality of any home-use inkjet printer available today. What's more, it's ability to deliver both photographic colour and black text printing makes it ideal for All your home printing needs.
- A4, A5, Envelope, Index Cards, Photo paper
- 1440 x 720 DPI

\$419

PREPS011



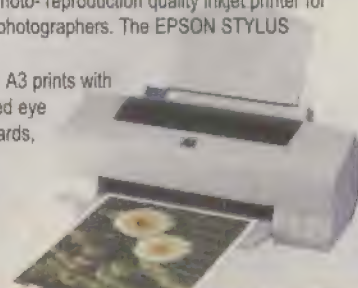
Graphic Reproductions

Stylus Photo 1200

- Introducing the A3+, six-colour photo-reproduction quality inkjet printer for graphic artists and professional photographers. The EPSON STYLUS PHOTO 1200 delivers 1440dpi, full-bleed A3 prints with ink droplets invisible to the naked eye
- A3+, A4, A5, Envelope, Index Cards, Photo paper
- 1440 x 720 DPI

\$965

PREPS025



Scanners

ScanJet 3200C

This affordable scanner features HP's exclusive Intelligent Scanning Technology to optimize photos, drawings and text automatically. And, you can pair it with your color printer to make color copies. Here's a versatile scanner for the entire family!

- 30bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- Parallel port connection
- HP PrecisionScan LT with automated OCR

\$179

IOHPD020



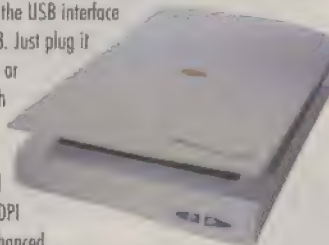
ScanJet 3300C

For easy scanning and copying, try the HP ScanJet 3300C. Setup is a breeze with the USB interface and Windows 98. Just plug it in. You can scan or copy at the touch of a button.

- 36bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- Windows 98 USB
- HP PrecisionScan LT with automated OCR
- Push button Scan and Copy

\$239

IOHPD027



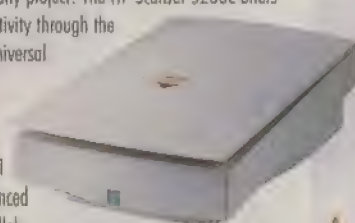
ScanJet 5200C

The HP ScanJet 5200C Business Series color scanner delivers quality results up to three times faster than other scanners. One button starts any project! The HP ScanJet 5200C offers hassle-free connectivity through the parallel port, or Universal Serial Bus (USB).

- 36bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- USB and Parallel port connection
- HP PrecisionScan 2.0 with automated OCR

\$455

IOHPD023



hp HEWLETT
PACKARD

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Sydney NSW 2000
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Fax: (02) 9267 5042

BubbleJet

Value

BJC-265SP

- Unbelievable value with this versatile bubblejet printer. For even greater versatility, the BJC-265SP offers the option of PhotoRealism inks.

The PhotoRealism inks for photorealistic prints at a low price.

- 3.4ppm/ 0.5ppm Colour
- 720 x 360 DPI

\$135

PRCAN026



Home User

BJC-2000SP

- The user-friendly BJC-2000SP features dual ink tank for true blacks. Meet the one-stop solution for all your home-office printing needs. The optional colour scan head can be used for colour scans, OCR and faxing. Windows 95 or 98 only.
- 720 x 360 DPI Resolution
- 5ppm/2ppm Colour

\$175

PRCAN029



Laser Beam

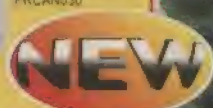
Desk Laser

LBP-800

- Compact desktop 8ppm laser printer with face up or down paper delivery, 125 page Multipurpose Tray and single sheet Manual Feed Slot. Comprehensive job control via Canon Advanced Printing Technology driver software including Match Paper Size, Multipage per Sheet, collate, Form Overlay, Customer Paper Size, Toner Saver and Automatic Image Refinement modes.
- 8ppm
- 600 x 600 DPI

\$575

PRCAN030



PRCAN018 LaserBeam LBP1760 **\$1735**

BubbleJet

SOHO

BJC-6000

- Presenting the ultimate in Speed, Quality, and Cost-Effectiveness. The new standard in colour printing from Canon. Using 6 colour printing and drop modulation technology, the BJC-6000 produces photorealistic images.
- Separate ink tanks for each colour
- 8ppm Black / 5ppm Colour
- 1440 x 720 DPI

\$475

PRCAN028



Professional

BJC-7100

- Need to print high quality colour images at high speed, then the 7 colour photo realism system in the Canon BJC-7100 will be the perfect choice. Capable of photorealistic printing on plain paper, this high speed bubblejet is perfect for the demanding graphics user.
- 8ppm/ 5ppm Colour
- 1200 x 600 DPI

\$515

PRHPD025



Compact

BJC-80

- Portable printing solution with all the features of a desktop printer. Drop modulation technology and features that are exclusive to the portable environment like IRDA. Best of all it is only 1.4Kg and fits in half a briefcase.
- AC/ Battery Powered
- 4.5ppm/ 1ppm Colour
- 720 x 360 DPI

\$335

PRCAN000



Instant Scan Capabilities

IS-12 Scanner head

\$135 PRCAN001

Scanners

Value

FB-330P

- Parallel
- A4 36-bit Scanner
- 300 x 600 DPI Optical Resolution
- Includes Canon Software Bundle

\$135

IOCAN010

PRICE DROP

Parallel Interface

SPB

FB-630P

- Parallel
- A4 36-bit Colour Scanner
- 600 x 1200 DPI Optical Resolution
- Includes Canon Software Bundle

\$175

IOCAN011

PRICE DROP

600 x 1200 DPI

USB

FB-630U

- USB A4 36-bit Colour Scanner
- 600 x 1200 DPI Optical Resolution
- Windows 98, iMac & Mac G3 Compatible
- Includes Canon Software Bundle & Canon Mac Plug-in (Canon Scan Toolbox in Place of Scangear Mac Adobe Photo Deluxe 20.)

\$229

IOCAN012

NEW



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Hot New Products

Professional Office Printer

Deskjet 970Cxi

- The premier photo-quality printer for busy professionals who take their image very seriously. Featuring stunning photo-quality with PhotoREt 3, and laser like text at up to 12ppm.
- Innovations like automatic two sided printing, USB connection and extra large 150 sheet paper tray are exclusive to the 970Cxi.
- 12ppm Black/ 10ppm Colour
- 2400 x 1200 DPI PhotoREt 3

\$795

PRHPD063



All in One

Office Jet T Series

- The latest Deskjet technology is used in the new HP T series OfficeJet. You get stand alone fax capabilities as well as scan, copy and print functions. All of this using HP's PhotoREt II, which means that image quality is excellent and print speed is faster than ever. All T series come with OCR and imaging software.

T65

- 11ppm Black/ 8.5ppm Colour
- 600 x 600DPI PhotoREt II
- 10 Speed dials

\$1185

PRHPD065

T45

- 9ppm Black/ 6.5ppm Colour
- 600 x 600DPI PhotoREt II

\$989

PRHPD064



DeskJet

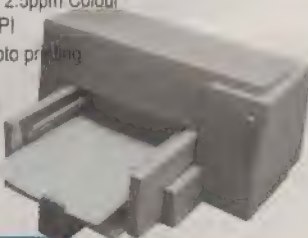
Economy

Deskjet 610C

- Inexpensive and easy to use, the HP DeskJet 610C printer produces affordable, high-quality colour and black printing for all your home and school needs.
- 5ppm Black/ 2.5ppm Colour
- 600 x 600 DPI
- Optional Photo printing

\$239

PRHPD061



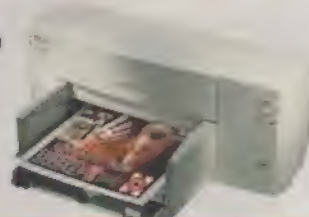
Value

DeskJet 810C

- Produce projects with photo-quality images and crisp black text for school and home easily, quickly and creatively with the new HP DeskJet 810C printer.
- 6.5ppm Black/ 4.5ppm Colour
- 600 x 600 DPI Photo REt II

\$339

PRHPD056



Home

Deskjet 830C

- For people who want a versatile printer to work faster and smarter. Featuring PhotoREt II and HP's Colour Layering Technology. This printer is the perfect all round machine, it has both parallel and USB connections.
- 8ppm Black/ 5ppm Colour
- 600 x 600 DPI PhotoREt II

\$389

PRHPD062



OfficeJet

Professional

DeskJet 880C

- Your creative printing projects will look their best with the HP DeskJet 880C printer. Whether it's spectacular colour photos or elegant type you want, the DeskJet 880C can bring your imagination to life.
- 8ppm Black/ 5ppm Colour
- 600 x 600 DPI Photo REt II

\$475

PRHPD051



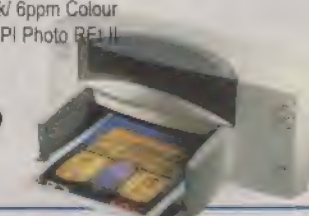
Office Colour

DeskJet 895Cxi

- The HP DeskJet 895Cxi delivers outstanding results that give you a competitive edge. Photo-quality colour enriches your documents with persuasive power. And crisp, rich blacks produce laser-quality text and graphics to impress the most discerning audience.
- 10ppm Black/ 6ppm Colour
- 600 x 600 DPI Photo REt II

\$639

PRHPD043



Over-Size PhotoColour

DeskJet 1120C

- Get the big picture with the HP DeskJet 1120C Professional Series printer. Photo-quality color and versatile printing at sizes up to 11 x 17 inches make it ideal for businesses that want printing options, not printer limits
- 6.5ppm Black/ 4.5ppm Colour
- 600 x 600 DPI Photo REt II

\$785

PRHPD025



LaserJet

Laser Quality

LaserJet 1100

- You need the convenience and privacy of a personal printer. With the HP LaserJet 1100 printer, you can put fast, personal laser printing for business right on your desk.
- 8ppm Black Laser
- 600 x 600 DPI
- 120 sheet paper tray
- Optional Scanner attachment

\$785

PRHPD041



Personal Laser

LaserJet 2100

- The HP LaserJet 2100 family offers versatile printing solutions for individuals and small workgroups. The LaserJet 2100 comes with outstanding features and offers a high degree of flexibility for your business requirements.
- 10ppm Black Laser
- 1200 x 1200 DPI
- 300 sheet paper tray

\$1345

PRHPD047



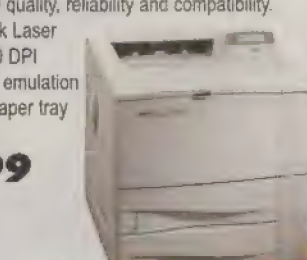
Workgroup Laser

LaserJet 4050

- HP LaserJet 4050 series printers set yet another benchmark, affording you the latest in networking printing technology backed by unparalleled quality, reliability and compatibility.
- 16ppm Black Laser
- 1200 x 1200 DPI
- Postscript 2 emulation
- 500 sheet paper tray

\$2299

PRHPD057



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OfficeJet

Economy

OfficeJet 635

- The HP OfficeJet 635 is a colour printer, colour copier, colour scanner and plain paper fax. This is the best value All-in-One product that makes it easy to complete your work.
- 5ppm Black/ 2ppm Colour
- 600 x 600 DPI Photo REt
- 150 sheet paper tray

\$685

PRHPD033



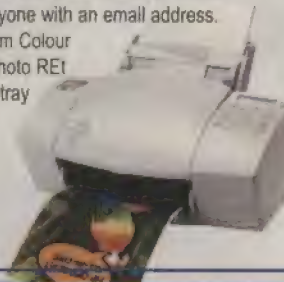
Colour Faxing

OfficeJet 725

- The HP OfficeJet Series 700 prints, faxes, scans and copies all in color. That's right-it even sends and receives color faxes with other color fax machines. You can even scan and send color documents to anyone with an email address.
- 5ppm Black/ 2ppm Colour
- 600 x 600 DPI Photo REt
- 150 sheet paper tray

\$779

PRHPD055



Office Laser

LaserJet 3100

- The HP LaserJet 3100 is a versatile business tool that delivers convenient printing, faxing, copying and scanning capabilities in a single laser device, and enables you to communicate more effectively with customers and clients.
- 6ppm Black Laser
- 600 x 600 DPI
- 100 sheet paper tray

\$1365

PRHPD034



OfficeJet

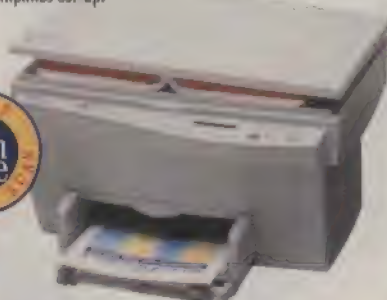
Flatbed

HP Office R45

- The reliable HP OfficeJet R45 fits right into the busiest home office or small business. It provides printing, scanning, and copying, all in colour, and all in one easy-to-use product. That saves space, reduces clutter, and simplifies set-up.
- 11ppm Black/ 8.5ppm Colour
- 600 x 600 DPI Printing
- 600 x 2400 DPI 30 bit Flatbed Scanning
- 100 sheet paper tray

\$1449

PRHPD058



Office Automation

HP Office R65

- The reliable HP OfficeJet R65 Series gives you high quality performance and versatility for professional results. The razor-sharp text and fast, photo-quality color printing makes documents stand out, whether they're financial spread sheets or color brochures.
- 11ppm Black/ 8.5ppm Colour
- 600 x 600 DPI Printing
- 600 x 2400 DPI 30 bit Flatbed Scanning
- 100 sheet paper tray
- 30 page automatic document feeder

\$1645

PRHPD059



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INSAM003

5000 pages per cartridge

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- Pages at 5% Coverage
- Easy to Use-Easy installation

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PRSAM001

Printer Toner Cartridge for ML-6050

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INSAM004

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- Optional Ethernet Card for Robust Network
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INSAM005



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Data Switches

Never again will you need multiply monitors, keyboards and pointing devices with the range of CPU Switching devices. A single keyboard, mouse and monitor can control up to 8 computers simultaneously without any cable changes. These CPU Switches are digital and require only the push of a button. Excellent for network administrators or anyone who wishes to control 2 or more computers hassle free!

Features:

- Supports Mouse/KB emulation for automatic bootup
- Supports VGA, SVGA & Multisync monitors
- LED's give current status
- Easy to install & use

Master View Plus

- PS/2 style or AT style keyboard and mouse connectors.
- Microsoft Intellimouse, Logitech First Mouse +, Mouse Man +
- Mouse Conversion - PS/2 Mouse Controls All Connection PCs
- Cascadable To three Levels

- CS-122 Switch between 2 PCs. Features:

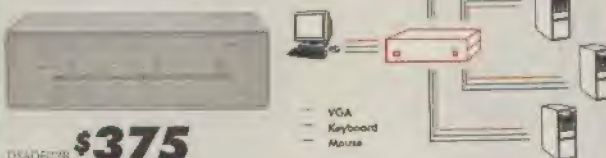
- VGA Bandwidth of 180Mhz
- VGA resolution of 1600x1200 @60Hz



\$275

- CS-114 Control up to 4 PCs with the CS-114.

- VGA Bandwidth of 100Mhz
- VGA Resolution of 1024x768 @80Hz
- Support intellimouse wheel



\$375

- CS-128

- 8 Port Switch Box

\$695

AT & PS/2

Item Code	Description	Price
CBGEN127	AT CABLE SET for CS-128	\$39
CBGEN128	PS/2 CABLE SET FOR CS-128	\$39

Master View Plus

- Microsoft Intellimouse, Logitech First Mouse, Mouse Man + ...Support
- Mouse Conversion - PS/2 Mouse Controls All Connected PCs
- PS/2 Style Keyboards Controls All PCs
- Superior Video Quality - Up To 1920 x 1440
- Cascadable To Three Levels
- LED Display For Easy Status Monitoring
- Rack Mountable
- Microphone and Speaker Support CS-1008, and CS-1016

EXCELLENT FOR MULTIMEDIA

- CS-138 Control up to 8 PCs with the CS-138. Features:

- VGA Bandwidth of 180Mhz
- VGA Resolution of 1600x1200 @60Hz

\$755

Rack mountable PS2 interface

- CS-1008 Audio Support

- Up to 8 PC Systems per Switch
- Connect up to 256 PC Systems
- 180Mhz VGA Bandwidth

\$795

- CS-1016 Audio Support

- Up to 16 PC Systems per Switch
- Connect up to 512 PC Systems
- 180Mhz VGA Bandwidth

\$1350

CPU SWITCH CABLE SET

each cable set connects to one computer.

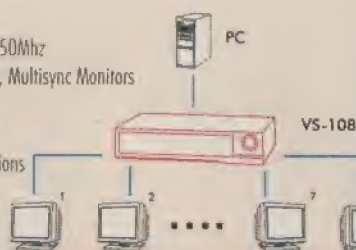
Code	Model	Price	Code	Model	Price	Code	Model	Price
CBGEN099	3M AT Cable Set CS122/114	\$35	CBGEN163	1.8M AT Cable Set CS122/114	\$29	CBGEN169	3M AT Cable Set CS1008/1016 Audio	\$39
CBGEN099	3M PS/2 Cable Set CS122/114/138	\$35	CBGEN164	1.8M PS/2 Cable Set CS122/114/138	\$29	CBGEN170	5M PS/2 Cable Set CS1008/1016 Audio	\$50
CBGEN177	3M AT Cable Set CS128	\$35	CBGEN166	10M PS/2 Console Extension M/F	\$65	CBGEN171	5M PS/2 Cable Set CS1008/1016 Audio	\$50
CBGEN199	3M PS/2 Cable Set CS128	\$35	CBGEN168	3M PS/2 Cable Set CS 1008/1016 Audio	\$39			

VIDEO SPITTERS

can duplicate PC video signals and amplify them for transmission to multiple monitors. These splitters are capable of supporting high band widths, which can easily accommodate the latest resolution technology. An excellent choice for presentations or broadcasting demos or special events.

Specifications:

- Supports Bandwidths to 350Mhz
- Supports VGA, SVGA, XGA, Multisync Monitors
- Max. Cable to 65 Meters
- Excellent for high quality multimedia and presentations



VS-132

2 Port Video Splitter
1920 x 1440 @80Hz

\$99

VS-134

4 Port Video Splitter
1920 x 1440 @80Hz

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VS-138

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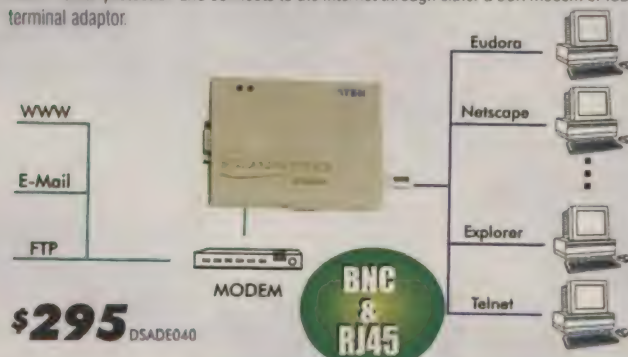


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- 1x parallel, 1x serial port
- Full compliance with USB Spec Rev 1.0
- Warning LED indicator for faulty or dummy USB port.
- Reliable transmission for 5 meters cable segment.
- Over current detection protection & recovery.
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- Support UHCI & OHCI spec.
- Windows FIFO UART

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Wish everybody on your network had Internet Access but not the high costs and complexity associated with multiple accounts. If this is you, then the IS-100 IP Sharing Device is for you. By using a single Internet account with the IS-100, your whole network can have Internet Access simultaneously. The IS-100 can also act as a DHCP server and offer Firewall protection and connects to the Internet through either a 56K modem or ISDN terminal adaptor.



USB ADAPTER

USB A CABLE



\$15 CBGEN155

USB B CABLE

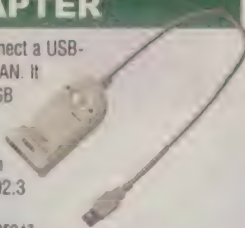


\$15 CBGEN156

USB ETHERNET ADAPTER

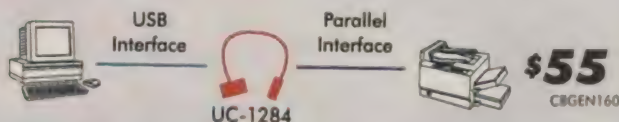
The USB Ethernet Adapter provides an easy way to connect a USB-enabled desktop or laptop PC to a 10BASE-T Ethernet LAN. It uses a USB type A receptacle for connection to the USB port and RJ-45 receptacle for connection to the network. No more internal PC cards to deal with. Just plug it in and your ready to go (PnP). Compatible with desktop and notebook computers. For use with IEEE802.3 10Base-T LANs.

\$95 DSADE043



USB TO IEEE-1284 BRIDGE

Connect your printer to your PCs USB Host controller with ease. Transparent and full automatic support for true bi-directional communication between your computer and your printer with no conflicts or installation hassles. Free up your parallel for other devices such as ZIP drives, Scanners and CD-ROMs by moving your printer to a USB port today!



USB to MODEM ADAPTER

With the UC-232, ATEN's new USB to Modem Adapter, installing an external modem is a snap. Free up your serial ports for other devices while IRQ conflicts will be a thing of the past. With our UC-232, installing a modem has never been easier. Just connect one end of the adapter to your modem and the other to your computer's USB port.

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Cases

EXTERNAL IDE CD-ROM CASE

It has never been easier to add a CD-ROM to your PC. With the Portable CD-ROM, you are only one cable away from numerous CD titles and flexibility. Connects to your Windows or DOS PC via the parallel port (LPT). A printer passthrough interface is also included so that your printer can work simultaneously with your CD-ROM.



\$130 CAADE008

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Use your internal SCSI CD-ROM or drives as a portable & removable device with the External SCSI CD-ROM Case. Easy installation for both MACs & PCs the External SCSI Case comes with a SCSI ID selector so that changing SCSI IDs is as easy as clicking a switch. The external SCSI interface is a Centronics 50 with pass through.



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CAADE015 SCSI II DB50 Case **\$150**
CAADE016 SCSI III DB68 Case **\$185**

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H: 390mm

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Code
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Model
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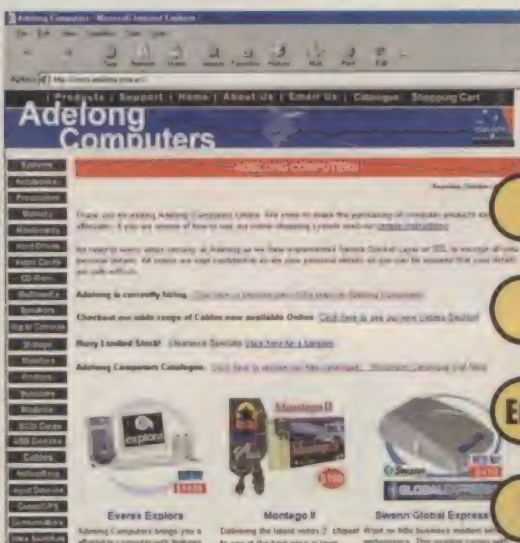
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Microsoft Office 2000 offers a multitude of new features which extend desktop productivity to the Web, streamlining work processes and simplifying how individuals and organisations share, access, and analyse business information.

Just a few of the new or improved features of Office 2000:

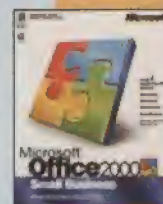
HTML as Companion File Format provides universal viewing of documents • Send E-mail directly from your Office programs • Let Office fix missing or

corrupted files • Make changes to Web pages easily • Enable team members to add comments and hold discussions about documents posted on an intranet site • Save a document to HTML and Office 2000 automatically selects the appropriate graphic format • Add live data from the Web into your formulas or charts • Add new data without reformatting cells • Import data from the Web into Excel • Easier to create, edit, and delete hyperlinks within documents, even to graphic hyperlinks • Create tables directly in Word 2000, Publisher 2000, FrontPage 2000 and PowerPoint 2000 • Place Interactive Charts on Web Pages and in E-mail • and much more!!

	Standard	Small Business	Professional	Premium	Premium + IntelliMouse	Developer
Word 2000	✓	✓	✓	✓	✓	✓
Excel 2000	✓	✓	✓	✓	✓	✓
Outlook 2000	✓	✓	✓	✓	✓	✓
Powerpoint 2000	✓		✓	✓	✓	✓
Publisher 2000		✓	✓	✓	✓	✓
Small Business Tools		✓	✓	✓	✓	✓
Access 2000			✓	✓	✓	✓
FrontPage 2000				✓	✓	✓
PhotoDraw 2000				✓	✓	✓
Dev. Tools & Database Runtimes						✓
Part number	(75956)	(75960)	(75958)	(75959)		(75957)
FULL VERSION	\$ 719	719	864	1,159		1,528
Part number	(76477)	(76481)	(76479)	(76480)	(77958)	(78410)
UPGRADE	\$ 390	395	495	595	625	865

- Word 2000
- Excel 2000
- Outlook 2000
- PowerPoint 2000
- Publisher 2000
- Small Business Tools
- Access 2000
- FrontPage 2000
- PhotoDraw 2000

- Word processing package including many design features that gear it for the Web
- Spreadsheets package integrating Web enabled data collaboration and information sharing
- E-Mail communications package with calendar and contact management facilities
- Presentation package with remote presentation capabilities to lift meeting presentations to new heights
- Desktop Publishing and design package for easy and inexpensive production of quality publications
- Includes Small Business Custom Manager, Business Planner, Direct Mail Manager & Small business Financial Manager.
- Database package used to create simple, useful databases, with improved interface to other Office 2000 applications
- Designed for creation and editing of Internet and Intranet Sites
- Photo Editing and Illustration package, all in one slick, smooth, and easy to use integrated package



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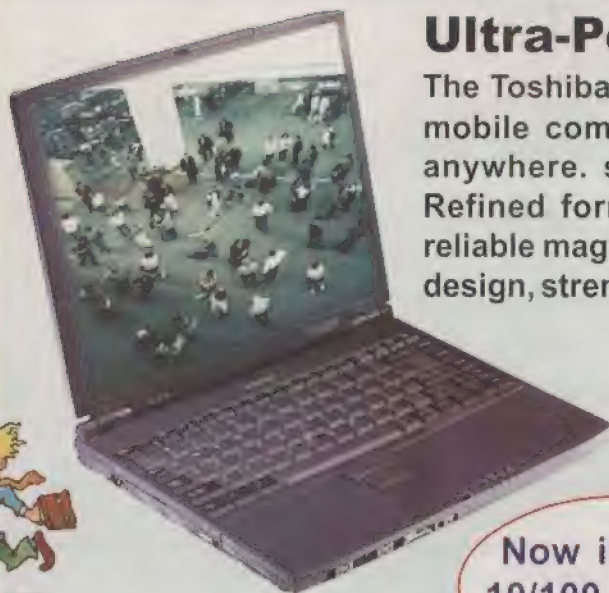
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Ultra-Portable

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From (79063)

\$4,497

Long Term Rent*

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per week

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10/100 Network
LAN

Only
1.4kg!!

Built in
modem

- Pentium II 300MHz
- 6GB HDD
- 64MB RAM
- 10.4" TFT



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Toshiba Install options

For a small extra charge we can install your chosen options into your new Toshiba: a modem, memory, a network card, etc...

Call Harris Technology on 1 300 13 9999 for more information.

Model	Portégé 3110CT	Portégé 7020CT
Processor	PentiumII 300MHz	Pentium II 366MHz
RAM Std/Max	64/128 MB	64/192 MB
Hard Disk	6GB	6GB
Screen	10.4" TFT	13.3" TFT
Display	800 x 600	1024 x 768
CD-ROM	No	No
Mic & Spkr	Yes	Yes
Battery Life	3+ hours	2+ hours
Port replicator	No	No
Select bay	No	No
DVD capable	No	Yes
Weight	1.4 kg	1.9 kg
Warranty	3 Years	3 Years
DAA modem	Yes	Yes
Op. System	Win 95/98	Win 95/98
Rent 3Yrs.**	\$33.99/wk*	\$49.80/wk*
Inc Tax	\$4,497	\$6,590
Part number	(79063)	(72305)

December

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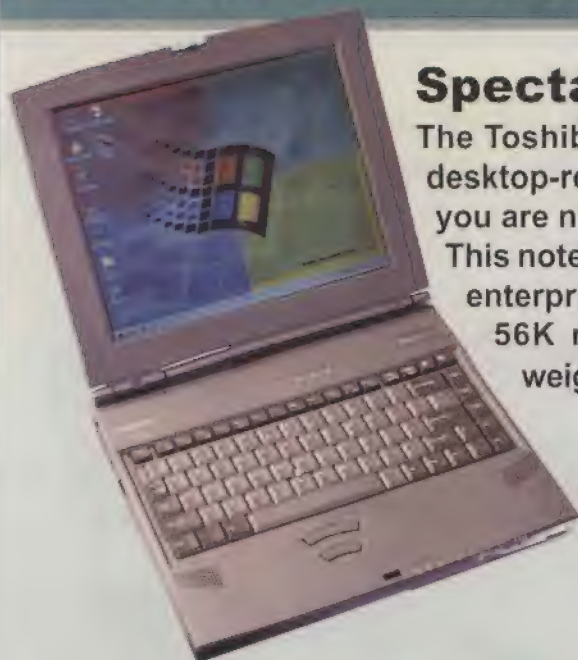
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Spectacular capabilities

The Toshiba Tecra 8000 Series is the ideal business desktop-replacement mobile computer. With a Tecra, you are never chained to a desk.

This notebook has everything on one platform making enterprise-wide solutions easy. An integrated V.90 56K modem, power to burn, all in a package weighing only 2.9kg. The possibilities are endless.

- Celeron 400MHz
- 64MB RAM
- 6.4GB HDD
- 14.1" TFT

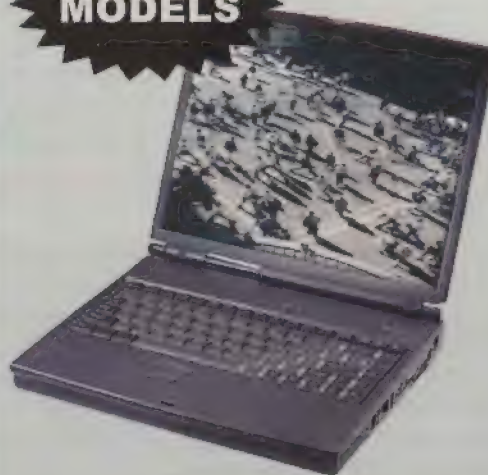
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\$5,650

Long Term Rent* T.A.P.**

\$42.70 per week

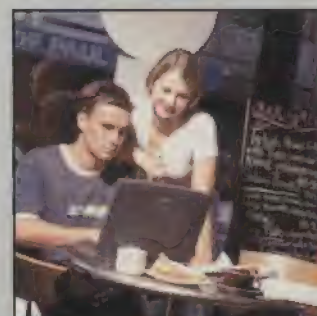
**NEW
MODELS**



Model	Tecra 8000	Tecra 8000	Tecra 8000
Processor	Celeron 400MHz	Pentium II 366MHz	Pentium II 400MHz
RAM Std/Max	64/256 MB	64/256 MB	64/256 MB
Hard Disk	6GB	6GB	10GB
Screen	14.1" TFT	14.1" TFT	14.1" TFT
Display	1024 x 768	1024 x 768	1024 x 768
CD-ROM	24x max.	24x max.	24x max.
Mic & Spkr	Yes	Yes	Yes
Battery Life	3+ hours	3+ hours	3+ hours
Port replicator	No	No	No
Select bay	Yes	Yes	Yes
DVD capable	No	No	No
Weight	2.9 kg	2.9 kg	2.9 kg
Warranty	3 Years	3 Years	3 Years
DAA modem	Yes	Yes	Yes
Op. System	Win 95/98	Win 95/98	Win 95/98
Rent 3Yrs.**	\$42.70/wk*	\$46.47/wk*	\$57.70/wk*
Inc Tax	\$5,650	\$6,150	\$7,634
Part number	(79069)	(79086)	(79071)

Op. System	Win NT 4.0	Win NT 4.0	Win NT 4.0
Rent 3Yrs.**	\$43.79/wk*	\$48.01/wk*	\$58.08/wk*
Inc Tax	\$5,795	\$6,349	\$7,685
Part number	(79070)	(79087)	(79072)

** Limited availability for Tecra 8000 Win95/98 & NT models



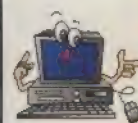
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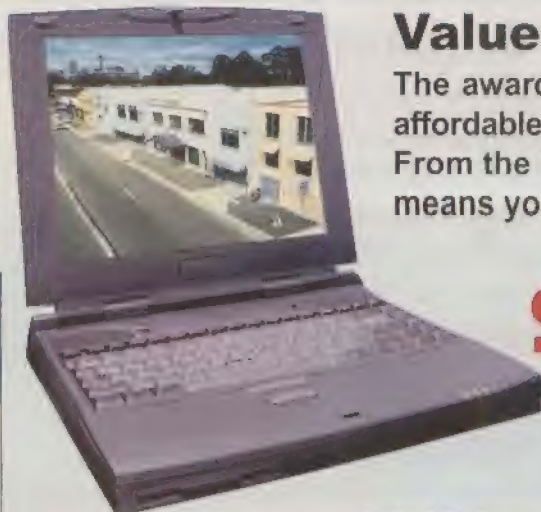
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For Independent Types: Satellite



Value built-in

The award-winning Toshiba Satellite Series is a range of affordable small business or home office mobile computers. From the home to the office, the unique all-in-one design means you never have to leave functionality behind.

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\$2,929

Long Term Rent*
T.A.P.** **\$22.14**
per week

Intel Celeron 400MHz
4GB HDD
64MB RAM
13.1" DSTN



Models
with DVD
also
available!



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Rental rates subject to conditions: to approved purchasers, rental figures shown are for 36 month terms. Please call us for the latest figures.

Model	with DVD!!			with DVD!!	
	Satellite 2590CDS	Satellite 2590CDT	Satellite 2590XDVD	Satellite 4090XCdT	Satellite 4100XDVD
Processor	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz	Pentium II 400MHz
RAM Std/Max	64/192 MB	64/192 MB	64/192 MB	64/192 MB	64/192 MB
Hard Disk	4GB	6GB	6GB	4GB	6GB
Screen	13.1" DSTN	12.1" TFT	14.1" TFT	14.1" TFT	14.1" TFT
Display	800x600	1024 x 768	1024 x 768	1024 x 768	1024 x 768
CD-ROM	24x max.	24x max.	DVD: 20x CD	24x max.	DVD: 20x CD
Mic & Spkr	Yes	Yes	Yes	Yes	Yes
Battery Life	2.5+ hours	2.5+ hours	2.5+ hours	2.5+ hours	2.5+ hours
Port replicator	No	No	Yes	Yes	Yes
Select bay	No	No	No	No	No
DVD	No	No	2.4x	No	2.4x
Weight	3.1 kg	3.1 kg	3.1 kg	3.1 kg	3.1 kg
Warranty	1 Year	1 Year	1 Year	1 Year	1 Year
DAA modem	Yes	Yes	Yes	Yes	Yes
Op. System	Win 95/98	Win 95/98	Win 95/98	Win 95/98	Win 95/98
Rent 3Yrs.**	\$22.14/wk*	\$26.65/wk*	\$34.20/wk*	\$32.41/wk*	\$43.30/wk*
Inc Tax	\$2,929	\$3,525	\$4,525	\$4,288	\$5,730
Part number	(79064)	(79066)	(78981)	(86062)	(79068)

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Options for Toshiba Notebooks

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TOSHIBA EDO Memory Upgrades

32MB for Tecra 8000/ Portege 7000/ Satellite 4000	(29356)	\$199
32MB for Portege 3110	(81078)	\$205
64MB for Tecra 8000/ Portege 7000/ Satellite 4000	(29348)	\$349
64MB for Portege 3020	(77229)	\$487

TOSHIBA Battery Packs

For Satellite 4000/4010/2520CDT and others	(21930)	\$129
For Portege 3010/3020 (Lithium Ion)	(73665)	\$139
For Satellite 4000 Series	(72109)	\$129
For Tecra 8000 (Lithium Ion)	(29358)	\$278

TOSHIBA High Capacity Battery Packs

For Portege 3010/3020	(72475)	\$278
For Portege 7000/7020	(66479)	\$330

TOSHIBA Battery Charger

For Tecra 8000	(29357)	\$489
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TOSHIBA Universal AC Adapter

For Tecra 8000/Satellite 4000/4010 and others	(44200)	\$134
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TOSHIBA Additional 2 Year Warranty

For Satellites with TFT Display	(21729)	\$182
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TOSHIBA Docking Station

For Portege 7000/7010/7020	(65958)	\$659
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TOSHIBA Port Replicators

For Tecra II 750/780/8000	(79226)	\$725
For Satellite 4030/4060/4080XCDT	(74088)	\$345

TOSHIBA Desk Station V+

For Tecra 500/550/650/700/750/8000 Series	(25446)	\$1,352
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TOSHIBA Carry Bags

Toshiba Friend Carry Bag	(75901)	\$78
Leather Bag for A4 Notebooks	(68408)	\$205
Classic Leather Notebook Carry Bag	(79770)	\$207

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For the latest pricing and information on these and many more Toshiba options, please check out the Web Direct Link. Or call the Harris Technology Call Centre staff. They are ready to answer your questions and help you make the right choice on 1300 13 9999.



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If you are looking for a top-performing corporate PC that's also easy to manage, the HP Vectra PC is the right choice for you. These award-winning desktop PCs lead the industry in making corporation IT environments highly manageable, stable and secure.

MultiPurpose, flexible

Quality and reliability

Latest technology

* Prices are ESP and are current at time of print. Prices are subject to change without notice.

Optional HP Ultra VGA 15" monitor (73463) **\$529**

Part Number	Processor	RAM	Hard Disk	CD ROM Drive	LAN	Op. System	Price without monitor*
(80449)	Pentium III 450MHz	32MB	4.3GB	Optional	✓	Win95	\$1,579
(75840)	Pentium III 450MHz	64MB	8.4GB	24x var.	✓	NT 4.0	\$1,999
(75831)	Pentium III 450MHz	64MB	4.3GB	Optional	✓	NT 4.0	\$1,799
(75832)	Pentium III 450MHz	64MB	8.4GB	32x	✓	Win95	\$1,899

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Monitors



HP 15"
Monitor
(72507)

\$424

HP 17"
Monitor
(65211)

\$564

HP 19"
Monitor
(78152)

\$998

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Now, more than ever, growing businesses can enjoy the latest PC technology at HP's best prices. HP Brio PC's come with additional features that assist growing businesses with everyday tasks, including the exclusive HP Brio Center for On-screen support.

- Celeron 500Mhz
- 64MB RAM
- 8.4GB HDD
- CDS 48x
- LAN
- Windows® 98
- 17" monitor
- Pentium III 500Mhz
- 64MB RAM
- 8.4GB HDD
- CDS 48x
- LAN
- Windows® 98
- 17" monitor

See Web Direct Link or call for pricing



**NEW
MODELS
!!!**



HP Kayak

Model: Kayak XA D6734N
Processor: Pentium III 500MHz
RAM: 128MB
HDD: 6.4GB UATA
CD-ROM: 32X IDE
Graphics: Elsa Gloria Synergy (AGP), 8MB SDRAM
LAN: Optional
Operating System: NT 4.0

(81526)

\$2,579

Model: Kayak XA-s D7984N
Processor: Pentium III 500MHz
Dual Processor
RAM: 128MB
HDD: 9.1GB SCSI
CD-ROM: 32X IDE
Graphics: Elsa Gloria Synergy (AGP), 8MB SDRAM
LAN: Combo SCSI/LAN Card
Operating System: WIN NT 4.0

(76186)

\$4,119

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Omnibook XE2

Celeron 433 - 32MB RAM - 4.8GB HDD - 12.1" TFT

Processor	C433	PII 400MHz	PII 400MHz
HDD	4.8GB	6.0GB	6.0GB
RAM	32MB	64MB	64MB
OS	Win 95/98	Win 95/98	Win NT
Screen	12.1" TFT	14.1" TFT	14.1" TFT
CD-ROM	24x	DVD	DVD
Modem	56K	56K	56K
Part #	(86463)	(86461)	(86462)
Rent/week	\$23.90	\$35.51	\$36.80
Price	\$3,159	\$4,699	\$4,869

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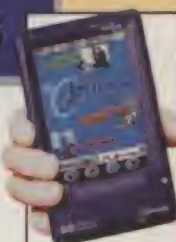
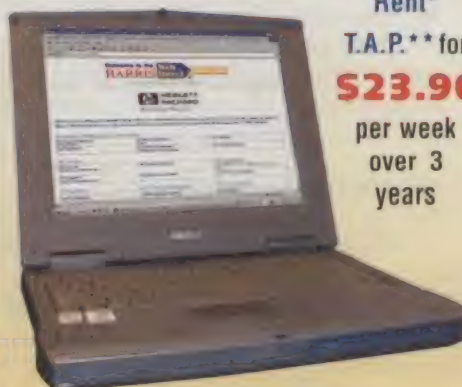
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T.A.P.** for

\$23.90

per week
over 3
years



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PC that fits in
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Brilliant 256
colour 240x
320 pixel
LCD, 32bit
processor,
100MHz 8MB
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**Jornada
820
Palmtop**

8.2" VGA,640
x480, 256
col., 190MHz,
16MB RAM,
16MB Burst
Mode ROM,
Win CE 2.2
Pocket
editions of Ms
Word,Excel,
Powerpoint
Outlook,Inter-
net Explorer
(71162)

\$1,699

Processor	P II 366MHz	P II 400MHz
HDD	6GB	6GB
RAM	32MB	32MB
Screen	12.1" TFT	12.1" TFT
CD-ROM	No	No
Modem	No	No
OS	Win 95/98	Win 95/98
Part #	(73317)	(83295)
Rent/Week	\$33.93	\$37.71
Price	\$4,490	\$4,990
OS	Win NT	Win NT
Part #	(73313)	(83272)
Rent/Week	\$36.20	\$40.95
Price	\$4,790	\$5,419

Omnibook 900

Pentium II 366MHz - 32MB
RAM - 6.4GB HDD - 12.1" TFT

From: (73317)

\$4,490

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per week over 3 years



Processor	P II 366MHz	P II 366MHz	P II 400MHz
HDD	4.8GB	6.4GB	10GB
RAM	64MB	64MB	64Mb
Screen	14.1" TFT	14.1" TFT	14.1" TFT
CD-ROM	24x	24x	DVD
Modem	No	No	No
OS	Win 95/98	Win 95/98	Win 95/98
Part #	(84892)	(76972)	(80224)
Rent/Week	\$39.92	\$45.27	\$55.89
Price	\$4,885	\$5,990	\$7,395
OS	Win NT	Win NT	Win NT
Part #	(84891)	(76971)	(82151)
Rent/Week	\$37.78	\$46.82	\$57.43
Price	\$4,998	\$6,195	\$7,599

Omnibook 4150

-Pentium II 366MHz
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-4.8GB HDD
-14.1" TFT

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DeskPro Desktop Computers

COMPAQ DeskPro EP

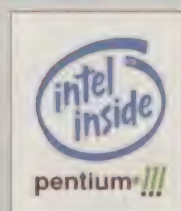
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- **Simple, flexible design** - lets you switch from a desktop to a minitower quickly and easily.
- **Intelligent manageability** - Industry-leading tools facilitate setup and day-to-day activities such as asset tracking and software management
- **Peace of mind** - Industry-standard compatibility, rigorous testing, strong partnerships and superior quality provides the confidence to run your business efficiently, cost-effectively and with superb reliability.



With Windows 98	Processor RAM Std/max Hard Disk Drive Graphics CD-ROM Drive Part Number Price Rent T.A.P	Pentium III 450MHz 64MB/384MB 10GB SMART II Ultra ATA Matrox Millennium G200-SD AGP 8MB SDRAM 32x (75487) \$2,079 \$15.72 /week/3yrs	Pentium III 550MHz 64MB/768MB 10GB Ultra ATA Matrox Millennium G200-SD AGP 8MB SDRAM 32x (79712) \$3,219 \$24.33 /week/3yrs	Celeron 500MHz 32MB/256MB 4.3GB SMART II Ultra ATA Embedded Intel 3D 8MB video memory Optional (84336) \$1,379 (82764) \$1,528
With WinNT4.0	Part Number/Price Rent T.A.P	(75486) \$2,165 \$16.36 /week/3yrs	(79713) \$3,299 \$24.93 /week/3yrs	

Call Harris Technology on 1300 13 9999 or see Web Direct Link for more information on these and other Compaq systems.



COMPAQ DeskPro EN

Outstanding consistency, performance, serviceability and manageability for enterprise environments

- **Latest Processor Performance** for performance to suit your business demands
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- **Highly stable** - Latest core technologies delivered in incremental models avoid unnecessary transition. Pre-installed drivers maintained as delivered with updates available on the Web.

With Windows 98	Processor RAM Std/max Hard Disk Drive Graphics CD-ROM Drive Part Number Price Rent T.A.P	Pentium III 450MHz 64MB/384MB 6.4GB SMART II Ultra ATA ATI Rage Pro Turbo AGP 2X 8MB SDRAM 32x (75483) \$2,299 \$17.37 /week/3yrs	Pentium III 550MHz 64MB/64MB 6.4GB Ultra ATA ATI Rage Pro Turbo AGP 2X 8MB SDRAM 32x (xxxxx) \$Call \$Call /week/3yrs	Celeron 500MHz 64MB/768MB 6.4GB SMART II Ultra ATA Embedded Intel 3D 8MB video memory Optional (86050) \$1,974 (86164) \$1,937
With Win NT4.0	Part Number/Price Rent T.A.P	(75482) \$2,365 \$17.87 /week/3yrs	(79594) \$3,499 \$26.45 /week/3yrs	

Optional
Compaq
monitors
for these
Deskpro
systems:

15":
(75487)

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17":
(75487)

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Several finance methods
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Armada Series Notebooks

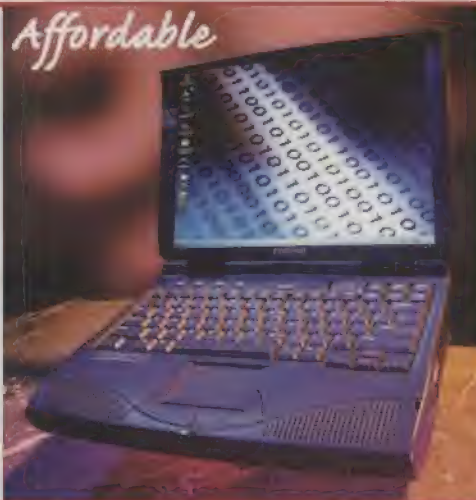
COMPAQ Armada 1500C

- Intel Celeron processor 366MHz
- 128K integrated cache
- 4GB Hard Disk Drive
- 32 MB SDRAM Standard Upgradable 160Mb
- 24x max CD-ROM
- Removeable Diskette Drive 1.44MB
- On Screen Resolution 800x600
- 64-bit video graphics with 2MB SDRAM
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- Integrated Speakers
- Windows 95

Rent* **\$19.80** /week/3yrs,T.A.P (78188)

\$2,619

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Compaq Carepaqs

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Deskpro 3
Yr Standard
On-Site 8x5
(71098)

\$279

Armada
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Yr RTB 8x5
(77991)

\$215

Armada
3000/6000/
7000 3Yr
OS 8x5
(77992)

\$165

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includes
stamp duty
and FID for
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options

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- Intel Mobile Celeron 333MHz Processor
- 11.3" CTFT SVGA (800 x 600)
- 64MG SDRAM standard, expandable to 128MB
- 4.3GB Hard Disk Drive
- Integrated Mini PCI V.90 / 56K modem
- Graphics capability - ATI RAGE LT Pro, 4MB of SGRAM
- 95%-sized full functioned keyboard for greater comfort
- Optional mobile expansion unit (MEU) for greater functionality and expandability
- Windows 95

Rent* **\$27.95** /week/3yrs,T.A.P (80331)

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*Feather
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COMPAQ Armada M700

- Intel Mobile Pentium II 366MHz Processor
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- 64MB SDRAM standard, expandable to 288MB
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- 24x max CD-ROM
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CPU	Intel Celeron 433MHz	Intel Pentium III 450MHz
RAM	32MB PC-100	64MB PC-100
HDD	6.4GB	13GB
Graphics	4MB UMA VRAM	14MB Video Graphics Card
CD-ROM	40x max	40x max
OS	Win98 Second Edition	Win98 Second Edition
Other	10/100 Ethernet PCI card	10/100 Ethernet PCI card
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Price	\$Call	\$Call



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Saves desktop space!

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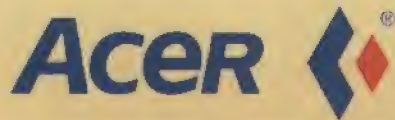


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CPU	Pentium III 450MHz	Pentium III 500MHz	Pentium III 500MHz	Pentium III 600MHz
RAM	64MB	96MB	128MB	128MB
HDD	8.4GB	13GB	20.4GB	20.4GB
CD/DVD	40x CD-ROM	40x CD-ROM	6x DVD	6x DVD
V.90 Modem	Yes	Yes	Yes	Yes
Monitor	Acer Aspire 15"	Acer Aspire 17"	Acer Aspire 17"	Acer Aspire 17"
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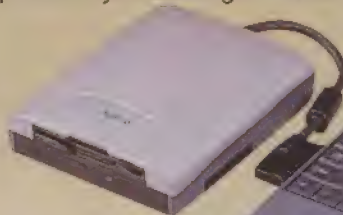
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332T

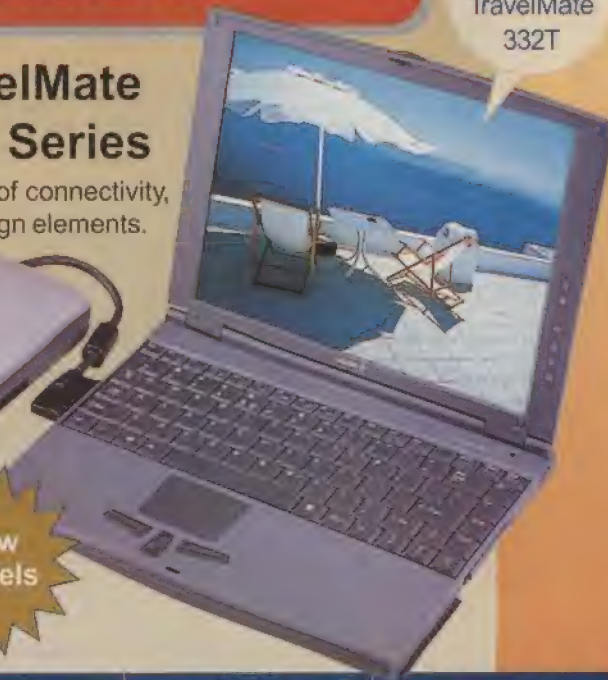


Acer TravelMate Notebook Series

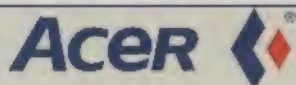
Perfect combination of connectivity,
portability and design elements.



New
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Model	332T	332T	506DX	512T	517TE
Screen	12.1" TFT	12.1" TFT	12.1" HPA	12.1" TFT	13.3" TFT
CPU	Pentium® II 366MHz	Pentium® II 366MHz	Celeron® 400MHz	Celeron® 366MHz	Pentium® II 366MHz
Memory	64MB	64MB	32MB	64MB	64MB
HDD	6.4GB	4.8GB	4.8GB	4.3GB	4.3GB
CD-ROM	24x	No	24x	24x	24x
DVD	No	2x	No	No	No
FAX/MODEM	56kbps	56kbps	56kbps	56kbps	56kbps
Op. system	Windows® 98	Windows® 98	Windows® 98	Windows® 98	Windows® 98
Part number	(84346)	(76172)	(xxxxx)	(xxxxx)	(84320)
Price	\$4,699	\$4,999	\$2,499	\$2,999	\$3,990



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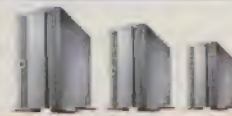
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- 64MB RAM standard (512MB maximum)
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- Graphics: Intel 810, 4MB and Direct AGP
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- CD-ROM 40x max
- Audio: SoundMAX
- Microsoft Windows 98 operating system installed

IBM PC 300GL

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- Mobile Pentium II 366MHz
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- PCMCIA support: 2 Type II or 1 Type III Card Bus
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Pentium II 400MHz

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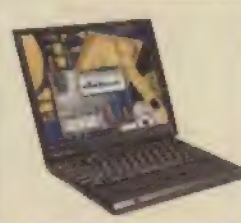
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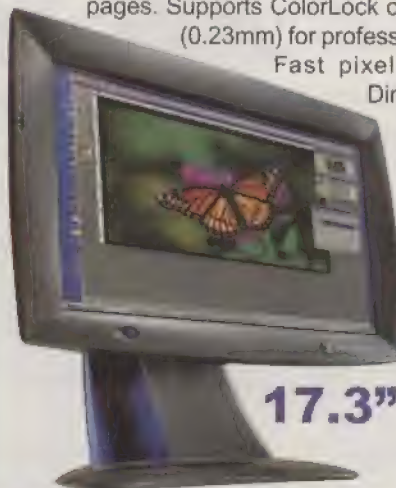
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Award Winning NT Visual Workstations

SGI Visual Workstations

Power Bundle Special - SGI 320 with SGI 1600SW Screen

SGI 320

- SGI Single Pentium III CPU 500MHz
- 9.1GB Ultra SCSI 10000 RPM HDD
- Cobalt Graphics Engine
- 128MB ECC SDRAM
- Windows NT Workstation 4.0
- 32x CD-ROM EIDE
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PLUS

Silicon Graphics 1600SW Flat Panel Monitor

- 17.3" display
- 1600x1024 resolution
- Digital Interface
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Dual Processor
Capable

Upgradable to
600MHz CPU

SGI 540

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- 256MB ECC SDRAM
- Stereo Speakers
- Cobalt Graphics Engine
- 3 yrs on-site warranty, next business day

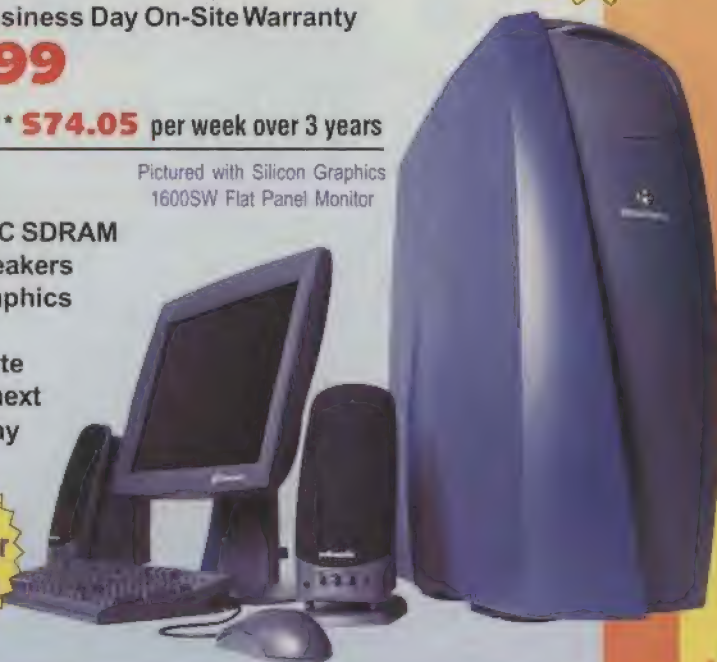
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1600SW Flat Panel Monitor

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What makes the SGI Difference?

Integrated Visual Computing Architecture (IVC) provides a tightly integrated combination of lightning-quick graphics processing, huge interconnects, and high-capacity graphics memory to move and process visual data at 3.2 GB/sec.

Cobalt Graphics Chipset, the heart of the Silicon Graphics 320 and 540 systems, includes high-performance 2D and 3D graphics processing, S-video, composite video, CD-quality audio, USB, and IEEE-1394, the 320 has three available PCI slots (540 has 6 available PCI slots) on two PCI-64 buses. Other features of the Cobalt™ graphics chipset which provide the stunning graphics performance include:

- * Hardware acceleration of 3D geometry, lighting, transforms, texturing, rendering and rasterization functions
- * Dynamically allocated memory that supports almost 1GB of texture memory
- * Extremely fast pixel fill
- * Real-time transfer of two simultaneous streams of video I/O
- * Support for resolutions up to 1920x1200 (24-bit double buffered)

SGI Systems have been designed with these applications in mind

3D Modelling: Creating & manipulating complex 3D models call for staggering amounts of system resource which only SGI systems can deliver.

Image editing and Manipulation: High resolution 2D images are becoming popular in DTP, only SGI systems have capabilities to handle this.

Video Editing: Silicon Graphics 540 Visual Workstation supplies the professional video interfaces & high systems bandwidth needed to work with un/compressed analog & digital video in real time.

Analysis: Silicon Graphics 540 Visual Workstation provides analytic capabilities far beyond most personal workstations. No other system has the power of an SGI.

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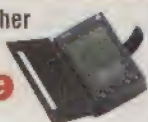
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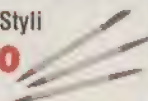
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Palm III 3-pack Styli

(60675) **\$20**



Palm III Cradle

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Palm V Cradle

(74669) **\$125**



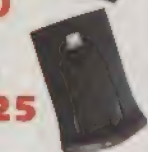
Palm V Leather Belt Clip Case

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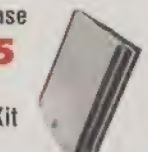
Palm V Modem

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Palm V Hard Case

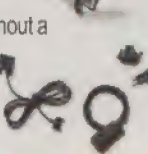
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For charging and synchronising without a cradle. HotSync cradle, plug adapters and AC charger

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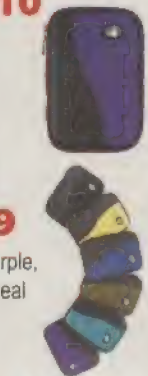


Palm III series PalmGlove

Shock-absorbent, water-resistant neoprene. Black:

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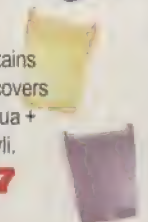
Also available: purple, olive, royal blue, teal and yellow



Palm III series Colour Shades

This fun pack contains 3 translucent flip covers in blue, lime & aqua + 3 black plastic styli.

(82253) **\$27**



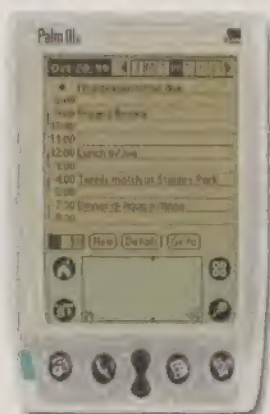
Palm™ Connected Organisers



Excellent Palm™ Computing from Harris Technology

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Palm IIIe™ Connected Organiser One Touch Organisation



Imagine having your daily schedule, important phone numbers, lists, meeting times and more in one organised place. It's easy and affordable with a new Palm IIIe™ connected organiser. And, at just 12cm tall and a mere 170g., it can go wherever you go - be it work, home, school or on vacation. Say goodbye to your bulky paper planner. The Palm IIIe™ connected organiser is an easy-to-use, pocket-sized way to keep track of your busy life. Choose from thousands of add-on applications. Internet ready. HotSync® cradle included. Stores approximately:

- 6,000 addresses
- 5 years of appointments
- 1,500 to-do items
- 1,500 memos
- 200 e-mail messages
- and lots of third-party applications.

(81158)

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Palm IIIx™ Connected Organiser More of a good thing

The Palm IIIx™ organiser gives you twice the memory of the Palm III™, and an open connector slot for room to expand. New advanced LCD screen technology improves viewing in dim light conditions or bright sunlight. Stores approximately:

- 12,000 addresses
- 5 years of appointments
- 3,000 to-do items
- 3,000 memos
- 400 e-mail messages
- and lots of third-party applications.

(74373)

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Intellisync Software 3.1

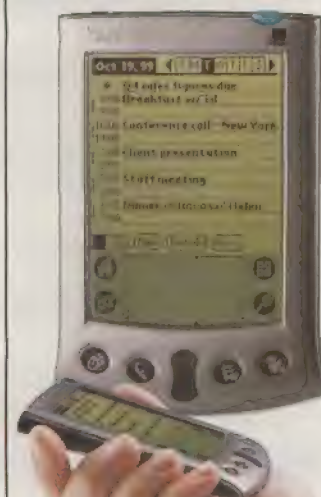
Excellent Conduit software to work with the Palm IIIx. Enables users to sync their PalmPilot organiser with common personal info management, contact management and group scheduling applications.

(65266)

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Palm V™ Connected Organiser Slim, sleek and elegant



Sleek design, anodised aluminium case. Only half the thickness of a Palm III. All your names, addresses, phone numbers, appointments, to-do's and email messages right at your fingertips. Recharge in minutes a day. And, a full charge lasts for up to a month. Stores approximately:

- 6,000 addresses
- 5 years of appointments
- 1,500 to-do items
- 1,500 memos
- 200 e-mail messages
- and lots of third-party applications.

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- 3 assignable application launch buttons
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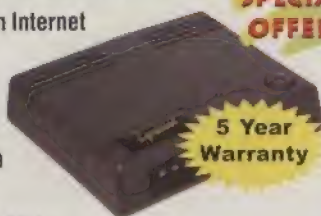
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- Send and receive faxes with high speed and clarity from your PC

ISA card (77577) PCI card (72909)

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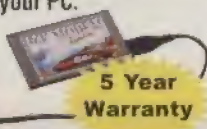


Dynalink PCMCIA modem

- PnP installation
- V.90/K56flex dual-mode for high Internet compatibility
- Send and receive faxes with high speed and clarity from your PC.

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MagicXpress TVView

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(85898)

\$559

PERMEDIA³ Create!

Premium graphics productivity for Web Design and creative professionals

Building on 15 years of high quality driver experience, Permedia3 Create! is a stable high-performance graphics card that Web and business professionals can depend on.

- flicker free 2048x1536 resolution with full 32-bit Z. Stencil buffers and GID planes in hardware deliver high-performance in windowed 3D applications
- Pentium® III and 3DNOW!™ Optimized
- Processor renders 100% of OpenGL 1.2 and Direct3D primitives



(85899)

\$299

OXYGEN[™] ACX

Oxygen[™] ACX combines Permedia² graphics processor with the outstanding display list drivers of Soft Engine 4. Features include birds-eye view, PanBars and ZoomBar. For professional 3D rendering Oxygen ACX provides 100% OpenGL 1.1 acceleration, Gouraud shading, and Z-buffering.



(85900)

\$1,699

OXYGEN[™] GVX1

Accelerated Geometry for workstation professionals. An industry first that lets you manipulate up to 256MB of textures in a single scene. Oxygen GVX1 implements a full demand-paged virtual texture sub system in hardware, using on-board graphics memory to cache huge textures stored.



(85902)

\$599

OXYGEN[™] VX1

Oxygen VX1 boosts the productivity of design professionals with best-of-class 2D and 3D performance through innovative technology such as Virtual Texturing that shatters the limitations of on-board graphics memory, fully accelerated Volumetric Rendering and Pentium® III optimized PowerThreads SSE OpenGL®



(85903)

\$2,699

OXYGEN[™] RPM

Oxygen RPM delivers an expansive 64Mbytes of unified graphics memory, high resolution true-colour displays and precision Z-buffering at the accessible price you've been waiting for. At last, the workstation-strength graphics you have always wanted at a price that won't break the bank.

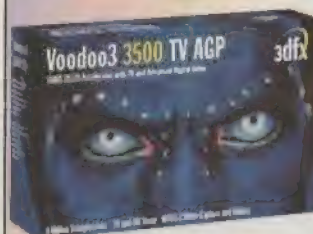


(85904)

\$4,299

OXYGEN[™] GMX

The Oxygen GMX, with the sizzling hot GLINT[™] GMX 2000 chipset packs full 3D-geometry and lighting acceleration with scalable rasterization processing into an industrial strength, high-end professional graphics solution. Oxygen GMX delivers incredible performance for your most complex and demanding CAD projects.



(75919)

\$599

Voodoo3

Designed to support the latest digital flat panel displays, the Voodoo3 3500 will include 3Dfx's proprietary flat-panel support, LCDfx. Voodoo3 3500 will be available in limited quantities for consumers who require flat panel support. Please note that this is a Limited Edition item, designed to support latest digital flat panel monitors

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Power Back Up = Power Protection

APC Back-UPS Pro[™]

For home
and office PCs

Smart battery backup and high performance surge
suppression for Windows 95 and NT PCs

- PowerChute[®] Plus software lets your UPS shut down your applications gracefully in the event of an extended power failure
- Additional outlet for protection of printers
- Audible alarms
- Phone/modem protection
- User replaceable, hot swappable batteries

APC Back-UPS Pro 280si	(76636)	\$325
APC Back-UPS Pro 420si	(76637)	\$399
APC Back-UPS Pro 650si	(76638)	\$580



APC Smart-UPS[®]

For small
office servers

- Instantaneous power from the Back-UPS prevents data loss caused by outages and brownouts
- Includes APC PowerChute[®] Plus software
- Hot-swappable, user-replaceable batteries
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- Three battery back-up/surge protection outlets
- One surge outlet for printer, fax, scanner etc.
- 10 Base-T/100 Base-TX network protection

Protects your data by supplying network-grade battery
backup when power fails



APC Smart-UPS 420	(67199)	\$512
APC Smart-UPS 620	(67198)	\$665

See the APC Web based sizing guide to help you select the appropriate UPS: www.apcc.com

APC PowerStack Power Protection[®]

For hubs,
switches, routers

Optimized Power protection for racked/stacked
internetworking equipment and thin servers

- Rackmountable: PowerStack models take up only 1U of rack space to protect internetworking equipment in racks where space is at a premium
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APC PowerStack 250	(78992)	\$499
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(56230)

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standalone PCs
which will shut
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SMART drive
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applications
gracefully in the
event of an
extended power
failure.

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APC

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8kVA, exp. to
16kVA

\$14,990
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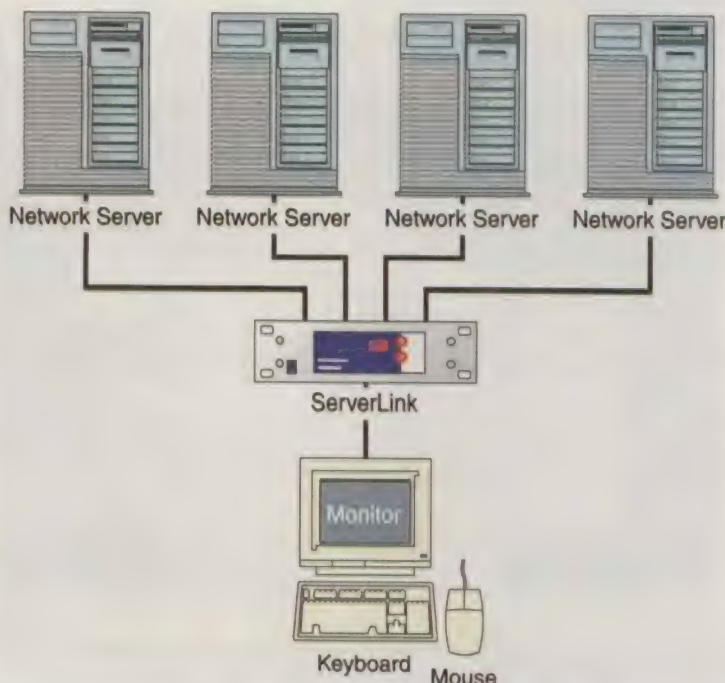
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Multi-Server Controller

Control up to 256 network servers with a single monitor, keyboard & mouse

With a ServerLink you can monitor and fully control up to 256 network servers with just one monitor, keyboard and mouse. Save money on expensive monitors, create more working space and cut down on your power costs.

Designed and manufactured in Australia by an award winning engineering company, ServerLink is packed with features, providing total control of your ever expanding network.



- Select servers via On-Screen-Display
- Name servers for simple selection
- Mouse & keyboard emulation for flawless booting
- Scan Mode for periodic server monitoring
- Supports PS/2 and Serial mouse emulation
- Only one physical mouse required to operate both PS/2 and Serial Servers
- Backup power feature eliminates system power failure
- EPROM upgradable for future technology
- 8 and 16 port models 19 inch rack mounted design

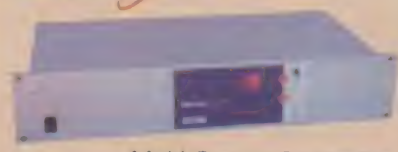
• Available in 4, 8 and 16 port models

• 3 Year warranty

• Australian made



ServerLink™

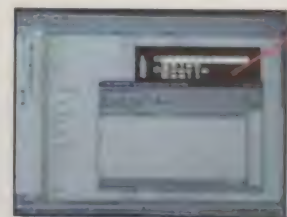


Multi-Server Controller

From

\$470

(71652, 4-port PS/2)



Pop-up
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Menu
Control

ServerLink™

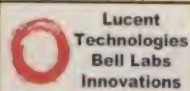
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Stay connected with Xircom

Xircom PortStation - Port Expansion System

The simple way to connect your Windows computer to virtually any number of devices. Connect printers, scanners, digital cameras, keyboards, mice and more. Image the ease of installing all your devices via one standard USB plug!



NEW!

Supports all makes and models of Windows** computers with USB ports

Connects virtually any parallel, serial and USB devices

Interlocking "mix-and-match" modules can be added or removed at any time

Simply add or remove devices without reconfiguring or rebooting your computer

Modules snap into system for quick and easy installation



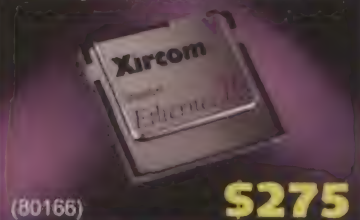
1. Choose the modules you need to connect devices to your computer.

2. Snap modules and end caps together.

3. Attach devices to PortStation modules.

4. Connect PortStation to your computer's USB port.

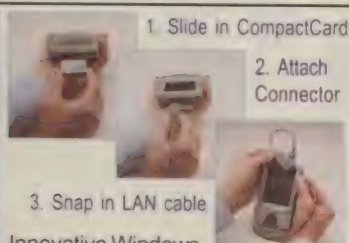
CompactCard™ Ethernet



(80166)

\$275

high speed, enterprise-wide E-mail access, Internet browsing and data synchronisation. Connects Windows CE hand-helds to 10Mbps Ethernet Networks • Rapidly synchronise and exchange data anywhere on the LAN at speeds nearly 200 times faster than a 56K serial connection. Low Power operation. Quick and easy installation.



Innovative Windows CE connectivity solution provides

CompactCard™ GSM



*** COMING SOON ***

wireless data communications via GSM phones. Send and receive E-mail, browse the Internet, and fax over a digital wireless GSM link at speeds up to 9600bps. Send & receive messages up to 160 characters. Synchronise your Windows CE handheld with Windows-based PCs from anywhere in the world.



Innovative connectivity solution provides Windows CE users with

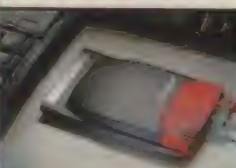


(72923)

\$255

Xircom RealPort Value 56 Modem

High speed 56K modem functionality for notebooks. All connectors are integrated into the card providing a robust, reliable and easy-to-use solution. No cables to lose, no moving parts to break.



(61795)

\$619

Xircom RealPort Ethernet 10/100 + Modem 56K

Combines 10/100Mbps Ethernet, 56K modem, GSM, AMPS cellular and ISDN connectivity, in a single cable-free Integrated PC Card. GlobalACCESS™. GSM upgradeable.



(67216)

\$290

Xircom RealPort Ethernet 10/100

High-performance 10Mbps and 100Mbps Ethernet connectivity for the most reliable access to information while in the office. Full-duplex Ethernet at 10Mbps.

PortStation Modules

End Caps

(82215)

\$195

7-port USB Hub Module: Adds 7 USB ports for printers, keyboards, mice, storage devices, etc.

(82217)

\$195

Parallel DB-25 Module: Adds one parallel port for printers.

(82218)

\$115

Serial DB-9 Module: Adds two serial ports for mice, handheld PDA cradles ext. modems etc.

(82219)

\$235

Serial PS/2 Module: Adds two serial ports for mice, keyboards, etc.

(82220)

\$125

Ethernet 10 Module: Provides connection to 10Mbps Ethernet networks.

(82221)

\$195

Modem 56 Module: Provides high speed 56K* modem connection.

(82222)

\$289

PortStation Kits (include end caps, AC power adapter and USB cable)

(82223)

USB Hub Starter Kit: 7-port USB Hub module

\$276

Connection Starter Kit: 4-port USB Hub + DB-25 + Serial PS/2 modules

(82224)

\$365

Office Communications Starter Kit: DB-25 + Serial PS/2 + Ethernet 10 modules

(82225)

\$399

*server download speed

**Win95 OSR2.1 (version 950b or 950c), Win98, WinNT 4.0 (SP3 and above) or Win2000

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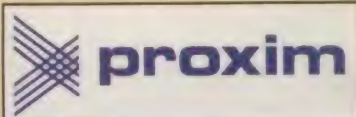
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Symphony Cordless Modem



Lets you access the Internet from your Symphony cordless network without wires. Simply plug the Cordless Modem into your phone jack.

(xxxxx)

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Symphony Cordless Networking

Symphony Cordless Networking products connect computers together without wires. Share printers, files and enjoy simultaneous Internet access anywhere in your home.

- Simultaneous Internet access with only one phone line, one ISP account
- 150 foot range, through multiple walls and floors
- True mobility for laptop users with pc card
- No hub required
- Fastest home network – 1.6 Mbps
- Connect up to 10 computers

Symphony Cordless Ethernet Bridge

If you have a cable modem, or ISDN router, or an ADSL gateway, the Symphony Cordless Ethernet Bridge allows you to connect your computers to the outside world through your high-speed access method. With a standard 10BaseT connection, installation is a snap.

(86014) Want Fly Buys points with that?

\$939



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PCComputing



PC WORLD

PC MAGAZINE EDITORS' CHOICE
April 6, 1999
Proxim Symphony™



Editors' Choice cnet

Symphony PCI Card

With the Symphony Cordless PCI Card for your desktop computers, you can enjoy the benefits of networking without the hassles of installing tricky wires and cabling. Easy to install, so you'll be ready to seamlessly network with all your Symphony-enabled computers in no time.

(86018)



\$290

Symphony PC Card

If you're a laptop user, the Symphony PC Card will free you to roam. Slide the standard PCMCIA Type II PC Card into the card slot and Windows 95/98 will automatically recognize it and guide you through the installation process. In a matter of minutes you'll be enjoying mobile computing anywhere in or around your home or backyard.

(86017)



\$329

Symphony ISA Card

Install the ISA card into any free ISA card slot in your desktop computer, complete the software installation and you're ready to seamlessly network with all your Symphony-enabled computers. Go cordless today!

(86016)



\$290

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Small-Medium Business Networks

D-Link DFE-660TX

56K Fax/modem
PCMCIA card V.90
and K56flex

This is a 32-bit high-performance dual-speed 10/100Mbps CardBus card designed to permit users on a move to easily connect to a network and share databases and resources in diverse environments. Supporting 20Mbps/200Mbps full duplex, this adapter is engineered to unleash the power of today's notebooks and turn them into robust stations or servers.



(69449) **\$178**

Also available:

Network Adapters

DM-560	(61678)	\$160
56K Fax/Modem PCMCIA card V.90 and K56Flex		
DE-660CT	(35862)	\$115
PC Card 10Mb with RJ-45/BNC connectors		
DFE-530TX	(62956)	\$59
PCI bus dual speed 10/100Mb network card		
DFE-570TX	(72786)	\$567
4 port PCI-bus 100Mb Fast Ethernet Server Interface card 4x200Mbps		
DFE-650TX	(56301)	\$180
PCMCIA dual speed 10/100Mb network card		
DFE-660TX	(69449)	\$178
32-bit PCMCIA PC-CardBus dual speed 10/100Mb		

D-Link DES-1016

D-Link DES-1016 Switch is designed to enhance workgroups performance while providing a high level of flexibility. The DES-1016 allows users to either connect 10Mb or 100Mb connections and boost response time and bandwidth.

- 16 port 10/100M dual speed
- Support Full/Half duplex
- Supports VLAN and port trunking



(69456) **\$1,198**

Also available:

Switches

DES-810	(53717)	\$815
10 port Fast Ethernet Switch with 8x10BaseT, 2x100BaseTX		
DES-815	(52206)	\$898
16port Fast Ethernet Switch with 12x10BaseT, 3x100Base ports		
DES-1008	(52207)	\$633
8-port dual speed 10/100Mb Smart Switch		
DES-1024	(76740)	\$1,667
24 port dual speed 10/100Mb Smart rack mount Switch		
DES-3224	(69457)	\$2,908
24 port dual speed Managed rack mount Switch		

D-Link USB Range

New from the D-Link USB Range:

These Universal Serial Bus hubs connect up to four USB peripherals or devices to their USB-ready PC. It provides out of the box industry standard Bus. It allows PC users to expand the number of USB ports on their systems.



DU-A2 - PCI Port USB Adapter	(78987)	\$56
DU-H4 - 4 Port USB Hub	(79131)	\$75
DU-H3SP - 3 Port USB Hub	(78989)	\$159

Also available:

Non USB Hubs

DE-809TP	(32350)	\$155
9-port Mini-Hub 9x UTP with Uplink Capability		
DE-809TC	(10388)	\$105
9-port 8x10Mb Hub with 1x Coax port		
DE-816TP	(51844)	\$295
16-port 10Mb Hub with 1x AUI/1x BNC Ports (Rackmount)		
DFE-904	(72789)	\$185
4-port 10/100Mb Dual Speed Hub		
DFE-905	(76617)	\$289
Fast Ethernet Network Kit		
DFE-908DX	(60558)	\$329
10/100Mb 8-port Stackable dual speed hub		

D-Link RAS Range

Dial-up Router, Internet
Server plus Remote
Access Server.

- Simultaneously shares 1, 2, or 4 modems with regular phone lines
- Connect your entire network to the Internet with only one ISP account
- Let remote users access your LAN for email, the Internet etc.



DI-510 1 x WAN, 1 LAN Port ISIP* Router	(79398)	\$425
DI-540 4 x WAN, 1 LAN Port ISIP* Router	(79400)	\$1099
DI-524 2x WAN, 5 Port hub	(79399)	\$799

* Internet Server IP

Also available: Print Servers/Routers/Modems

DP-300	(53598)	\$450
Dual Speed 10/100Mbps Multiprotocol Print Server 2 Parallel 1 Serial		
DP-602	(81535)	\$465
Internet Server		
DP-692	(85108)	\$579
2 port Internet Server with built in 9 port hub and uplink		
DP-802	(78985)	\$555
DP-802 Internet and Print Server		
DP-601M	(85107)	\$543
Internet Server for SOHO networks with built in 56K modem		



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For all your small to medium business and home network needs please call for more information and pricing. We have an extensive range of fantastic D-Link products on our database.

Cost-effective Connectivity Solutions

Analog Modem Router



model
RM 356

(70197) **\$579**

Connect multiple PCs to the Internet easily

Provides shared Internet access in a box. Small offices/home users can connect multiple PCs to the Internet with a single connection, using one ordinary phone line and one Internet Service Provider account.

Router + integrated 56K modem + integrated 4-port 10BaseT hub • DHCP server • Dynamic NAT+ • Dial-on-Demand-routing • Hi/fn (STAC LZS) compression • Five year warranty

ISDN Router



model
RT 328

(68900) **\$679**

Home office Internet access in a box.

Includes built-in ISDN TA, 128 MultiLink PPP, DHCP Server, Dynamic NAT+, Dial-on-Demand Routing. Setting new standards in ease of installation, features & price.

Provides Internet access, LAN-to-LAN intranet connection, and remote access for a single user, a small business, or a branch office over ISDN.

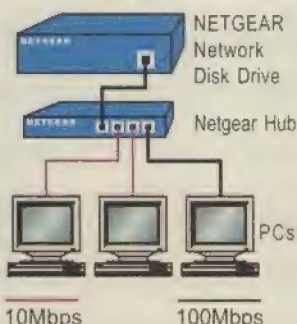


- No hassle of adding internal hard drives
- One-step installation on your PC. No complicated server setup or hardware installation required
- Provides performance close to that of an internal hard drive
- Microsoft, Unix, Novell compatible

Are you running out of space?



Add extra Hard Drive capacity to your network with NETGEAR Network Disk Drives!



model
ND 508 **8GB**

(79013) **\$1,199**

model
ND 520 **20GB**

(79014) **\$1,927**

NETGEAR Network Disk Drives are the first information appliances to use high speed networking technology to simplify the use and installation of storage space on the network. By using a high speed network instead of adding internal hard drives you can add disk capacity for storing customer files, pictures, applications, or any other data quickly & easily.



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Gigabit Switches

The FS509 and FS518 high-performance Fast Ethernet Gigabit switches provide a cost effective way to instantaneously boost network performance. Secure the power of Gigabit Ethernet to speed up server and backbone access. Automatic speed & full/half duplex sensing.

The GS504 Gigabit Fibre Switch is a high performance network switch that provides back-bone connectivity for power work-groups, data centers, and server farms.

model
FS 509 **\$1,749**

(76840)
Eight switched 10/100 Mbps ports + one 1000Mbps port (Gigabit E'net uplink)

model
FS 518 **\$2,917**

(81514)
Sixteen switched 10/100 Mbps ports + two 1000Mbps ports (Gigabit E'net uplink)

model
GS 504 **\$3,215**

(81515)
Four full-duplex Gigabit fiber ports
Netgear offers free, 24-hour phone support



NETGEAR™

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more information or to ORDER ON-LINE

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Take the Work out of Networking

10/100Mbps Starter Pack



- 4 Port 10/100Mbps Hub
- 2x10/100 PCI NICs
- 2x Cable, Instal. Guide

These Network Starter Kits contain everything that Windows users need to start networking right away, all in one box.

DB 104

10/100Mbps Network Starter Kit (77292) **\$279**

10Mbps Starter Pack



- 4 Port 10Mbps Hub
- 2x10/100 PCI NICs
- 2x Cable, Instal. Guide

With this simple and affordable pack, NETGEAR brings the benefits of networking into the hands and budget of small businesses.

SB 104

10Mbps Starter Kit (13277) **\$157**

10/100 Dual Speed Hubs



These Netgear hubs connect multiple PCs to share printers, files, Internet access and e-mail communications. Mix and match 10 and 100Mbps PCs, servers and peripherals on the same network with ease and without the high cost and

complexity of multiple hubs and bridges. All feature easy, plug-and-play installation, Auto-sensing dual speed ports & vista network ports with built-in LEDs.

DS 104 4-port Slimline (70795) **\$215**

DS 108 8-port Slimline (18755) **\$306**

DS 116 16-port Slimline (81519) **\$478**

Full connectivity among devices. Compact, sturdy, metal case.

DS 524 24-port Stack. (69474) **\$998**

Stack up to 8 hubs via provided cascade cables. Includes rack-mount kit. Plug 'n' Play.



10Mbps Ethernet Hubs



Vista jacks with built-in LED indicators • Uplink port for network expansion • Slim, sturdy metal case design • BNC/AUI backbone support Option • Limited lifetime warranty • Easy Plug and Play installation

EN 104TP 4-port Slimline (53456) **\$73**

EN 108TP 8-port Slimline (53458) **\$115**

EN 116 16-port Slimline (53459) **\$219**

EN 516 16-port Rackmount (17425) **\$248**

EN 524 24-port Rackmount (17435) **\$326**



- 16 or 24 10BASE-T ports
- Easyplug-and-play installation
- Vista network port with built-in LEDs
- BNC/AUI backbone support
- Internal power supply

10/100Mbps Fast Ethernet Switches

The NETGEAR FS104 and FS108 feature 4 or 8 switched 10/100 Mbps ports, auto-speed and duplex mode sensing. Versatile and compatible. Compact and easy to install. Vista jacks with built-in LEDs.

FS 105 5-port Slimline (84722) **\$299**

FS 108 8-port Slimline (70905) **\$425**



The NETGEAR FS 516 and FS524 switches provide powerful, network center performance

with all 16 or 24 ports capable of 10 or 100 Mbps, half- or full-duplex operation, automatic speed sensing. Ideal for segmenting networks into small, connected subnets. Vista network ports with built-in LEDs.

FS 516 16-port Slimline (60522) **\$1,419**

FS 524 24-port Slimline (77549) **\$1,470**

NETGEAR

FA310

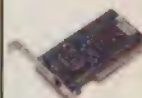
Ethernet Adapter.
10/100 PCI (Speed sensing, PnP) (53460)

\$62

FA310

10-pack
Save money!
(75734)

\$465



FA410

PCMCIA
Network Card
(60071)

\$169



EA101

USB 10
Megabit NIC
(81289)

\$98



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Remote Access Solutions

DSP (digital signal processor) adapters from Digi are cost-effective, high density remote access, fax, routing and unified messaging solutions for your network.

DataFire® RAS



Scalable Server-Based Remote Access Concentrators for Analog and Digital Connections

Essential to server-based communications solutions are reliable, standards-based communication adapters. Digi products have gained a reputation for compatibility, performance and reliability that is unmatched. The Digi DataFire Family of DSP based RAS concentrator adapters provides the widest compatibility and most powerful performance available in a PCI or CompactPCI slot. For demanding, server-based applications including modem-pooling, remote access, advanced fax, World Wide Web and branch office internetworking, you won't find a better product line than DataFire.

- Up to 60 K56Flex/V.90 modem channels per PCI slot
- Scalable configurations from 4 (BRI) ports and from 30 to 60 (BRI) ports
- Digi PortAssist SNMP Web-based manager-easy configurations & management
- Device Drivers Developers Kit
- Support for both analogue and digital connections

TAFire RAS 4 B4ST	(85976)	\$4,099
TAFire RAS 30 PE1	(85974)	\$12,199
TAFire RAS 60 PE2	(85975)	\$17,942

Call us on 1300 13 9999 or see Web Direct Link for the latest information and pricing on Digi products!

AccelePort® RAS



No other card is more accepted

Integrated Modem Adapters for High-Speed Analog Connections

As the communication needs of businesses grow, so does the need for dial-in and dial-out services for the users. Standard open-systems PC servers equipped with Digi's AccelePort RAS adapters take on unified communications tasks for businesses of all sizes by efficiently handling remote communications and performing as Internet and fax gateways for dial-in users. Digi's AccelePort RAS adapters provide the widest compatibility and most powerful performance available in a PCI slot. For demanding, server-based applications including modem pooling, remote access, advanced fax, World Wide Web and branch office gateways, you won't find a better product line than Digi's AccelePort.

- Support for speeds up to 56Kbps/V.90
- 4 or 8 port integrated analog modem card
- Digi PortAssist SNMP Web-based manager-easy configuration and management
- Device Drivers Developers Kit
- Widest range of OS support

Acceleport RAS 8 A8	(85977)	\$3,893
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Smart Storage Solutions

Zip 250MB USB

Provides high-capacity storage in an easy-to-use format that can go from desktop to laptop quickly and reliably. Sporting a sleek new design, the Zip 250MB USB drive enables users to access high-capacity storage without the need for larger parallel port or SCSI conversion cables. Backward compatible with 100MB USB media, and has a PCMCIA option that allows you to access data anytime and from anywhere.

Zip 250 USB drive (82633) **\$350**

USB/PC Card (82780) **\$399**



ZipCD



\$425

(82779)

The internal iomega ZipCD drive reads, writes and rewrites a range of CD formats and, with the proven reliability of the iomega brand, is perfect for anyone who wants to transport and share important files and presentations on a common CD format. With a capacity of up to 650MB, his drive performs at a speed of 4x record, 4x write and 24x read.



Zip 100MB disk:

(23772) **\$19**

10-pack:

(21889) **\$184**

Zip PCMCIA SCSI accelerator card

(35145) **\$192**

Zip ISA SCSI Zoom accelerator card

(21888) **\$54**

Zip drive carry case

(31823) **\$52**

Zip parallel cable

(46305) **\$38**

Zip SCSI cable

(46304) **\$38**

Zip disk labels 20-pack (48059)

\$4

Zip 6-disk wallet (35146)

\$26

Zip Tools for NT (35149)

\$32

Jaz 1GB disk (24218)

\$170

3-pack

(32844) **\$496**

Jaz Jet - PCI SCSI controller (31591)

\$195

Jaz PCMCIA SCSI card (44744)

\$218

Jaz cable converter (46306)

\$27

Jaz universal power supply (35154)

\$58

Jaz Traveller SCSI to parallel adapter (32860)

\$89

Jaz SCSI cable 50HD to 25HD (46311)

\$68

Call or see Web Direct Link for more!

iomega Soak up the Sun

Purchase any iomega Drive between 1 November and 31 December 1999, call 1300 360 947 to receive your FANTASTIC FREE Beach Chamois, AND go in the draw for a trip for two to Hayman Island for 7 days. See back of Wobbler or call Harris Technology for conditions of entry.



Jaz 2GB External



\$645

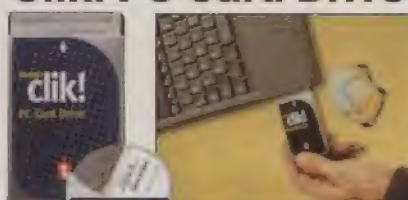
(78941)

The external Jaz 2GB drive is faster than many hard drives, has a full 2GB of storage space in each removable disk, gives you the freedom to take your files with you, and is backward compatible with industry standard Jaz 1GB disks. Does not include Jaz disk.

Jaz 2GB disk single (61652) **\$196**

Jaz 2GB disks 3-pack (57271) **\$519**

Klik! PC Card Drive



(78902)

\$346

Integrated, high-capacity removable solution for notebook users. Sleek and compact drive, fits into most notebooks. Store, protect and share important information on a 40MB Klik! disk.

Klik! disks 2-pack (75984) **\$59**

Klik! disks 10-pack (75985) **\$170**

Klik! Drive

Go anywhere storage for digital cameras and mobile computers. This 6 oz. battery-operated handheld drive slips nice and easy into your pocket when you are on the go. Each 2" square Klik! disk holds 40MB of re-writable, removable storage for your mobile stuff.

\$465

(75501)

Klik! Drive Mobile (76743) **\$539**

Klik! Battery (83737) **\$120**

Klik! Power Supply (78925) **\$30**

Zip 250MB

Portable, light, easy to use and holds more files than ever before! Backwards compatible with 100MB Zip disks. Comes with 1 Zip 250MB disk. iomega tools supplied on CD.

Parallel (74450) **\$289**

SCSI (74451) **\$289**

Disk Single (74454) **\$35**

Disk 10-pack (74452) **\$319**

Zip USB

Now USB enabled PC users running Windows 98 can connect the sleek, translucent ice-blue USB Zip drive, and reap the benefits of simple connectivity and unlimited storage capacity. Once the iomegaWare software has been loaded, remove and swap this drive with other USB devices without rebooting your PC.

(71103)

\$245

Zip Starter Kit

Get started with the Zip Starter Kit! This parallel port Zip drive comes with four fun and practical, coloured 100MB Zip disks that are ideal for colour coding all of your computer stuff in the office, at home, at school, or anywhere.

(70623)

\$249

Buz

The easiest way to get multimedia from camcorders, DVD, CD-ROMs, VCRs and laserdiscs into your PC! It's a video capture and editing board combined with an Ultra SCSI controller that lets you capture multimedia into a PC, edit it using the easiest software around, and share it using Jaz or Zip disks, VCR tapes or the Internet.

(78664)

\$339

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Marble
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\$109



TrackMan
Live
Wireless PC
Controller
(77753)

\$239



!

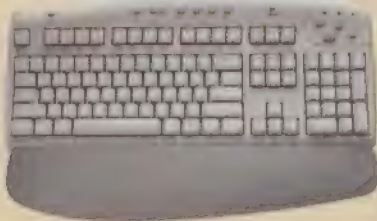
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rebate on
Cordless Wheel
Mouse -
on-box return
coupon or
download it
from the
Logitech
website.
Customers will
receive a \$10
rebate* by
cheque directly
from Logitech.

*Valid until 31/12/1999

December
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30

Internet Keyboard with iTouch

The Logitech Internet Keyboard and iTouch™ software put one-touch Internet and multimedia control at your fingertips. Start typing right away with a familiar, comfortable key layout. Responsive keys provide an exceptional touch. Relax your hands on the attractive palm rest during breaks and easily remove it for extra space.

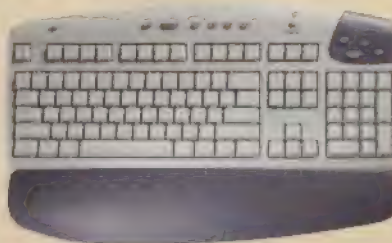


(60332)

\$59

Cordless Desktop iTouch

A cordless keyboard and cordless wheel mouse combination to free you from cords that tangle. No pointing at the computer or clear path required. With convenient iTouch Internet and multimedia control, access the Internet, search, open e-mail, play CDs, DVDs or MP3 and more with one touch of a key. 5-year warranty.

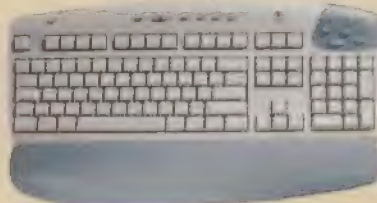


(82772)

\$169

iTouch Keyboard with USB Hub

The Logitech iTouch keyboard lets you control multimedia, access the Internet, search, open e-mail and more with one touch of a key. Start typing right away with a familiar, comfortable key layout and responsive keys that provide an exceptional touch. Plug additional peripherals into the 2 built-in USB ports. 5-year warranty.



(84807)

\$86

Cordless Wheel Mouse

Fast scrolling in Windows 98, 95, NT. Cordless freedom through digital radio technology for unmatched performance. Comfortable for right and left hands.

- Digital radio technology for maximum reliability
- Scroll in Windows 98, 95, NT applications
- Innovative scroll wheel is also a third mouse button
- Comfortable rounded shape fits right and left hands



(77761)

\$99

Cordless Mouseman Wheel

Cordless MouseMan Wheel gives cordless freedom with enhanced comfort and performance.

- Sleek shape with unique soft-touch sides and cordless freedom of movement, works without being pointed at the computer
- Provides easy scrolling in Windows and on the Web, and the added convenience of a fourth mouse button - includes Logitech MouseWare software to customise the buttons with timesaving shortcuts



(78677)

\$119

QuickCam™ Express Camera

Snap stills. Shoot video. Email them anywhere in one click. Or make live video calls! QuickCam™ Express - The simple way to get closer™.

- Capture stills and video instantly
- Email images in a single click
- Meet face-to-face online
- Over 1 million QuickCams sold
- USB connector for easy installation
- Works with Windows® 95 or 98



(80121)

\$99

Soundman X1 Speakers

Experience the full richness of CDs MP3 and multimedia. Innovative compact design delivers realistic, high definition sound for PC's, portable CD players and TV. High definition sound with solid bass - 25 Watts RMS.

- Excellent for CD music, Internet and MP3 audio
- 3 year product warranty



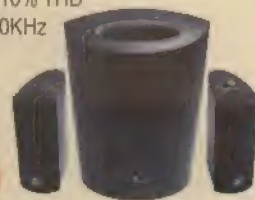
(81655)

\$135

Soundman X2 Speakers

Two compact "Midnight Grey" coloured speakers and a subwoofer. Clear, crisp sound through patented LIMAD (Linear Magnetic Drive) technology.

- Total output power of 40 watts RMS @ <10% THD
- Frequency response between 30Hz & 20KHz
- Automatic on/off sound detection
- Volume & bass controls
- Integrated power supply
- Headphone jack



(84808)

\$190

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or T/T. Call for details.

... and when you play!

Logitech GameCam

Logitech GameCam lets players see themselves on the computer monitor as they interact with PC-generated opponents and objects like basketballs or volleyballs inside a variety of virtual environments while using their own gestures to control play.

Includes QuickCam USB camera

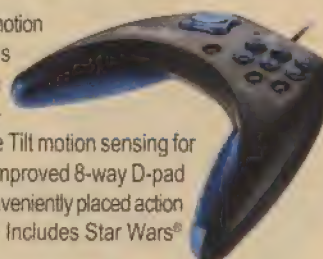


\$260 (84810)



Wingman® GamePad Extreme™

Feel free to win with the ultimate motion sensing-gamepad. Delivers precise proportional control with engaging G-Force Tilt™ technology. • Ultra accurate G-Force Tilt motion sensing for superior proportional control • Improved 8-way D-pad for fast digital movement • Ten conveniently placed action buttons for superior firepower • Includes Star Wars® Rogue Squadron 3Elite Mission



\$87 (78674)

Wingman® Formula Steering Wheel

The realistic wheel for gamers who love driving and racing!

New Ferrari yellow wheel, sculpted with rubber grip for comfort & control

- Precise and smooth steering • 2 shifters, 4 buttons on the wheel • Gas and brake pedals on stable base • USB/game port combo



(81506)
\$182

Wingman® Force Joystick

Gain realism and lose those sloppy, jerky gears with the world's only immediate forcefeedback precision joystick. Push the stick that pushes back! Exclusive I-FORCE® technology creates a killer force feedback experience. High torque motors drive the stick with no gears, slop or jerkiness. • Combat equipped with 8-way hat switch, 9 buttons and more • Direct X compatible • USB & Serial



(69367) **\$178**

Wingman® Extreme™ Digital 3D

Designed to handle the games of the new century!

- Twist handle for precise rudder control • Versatile grip handle for flexible hand comfort and control
- 7 programmable buttons, all within easy reach • High-precision throttle for accurate power settings • Select USB or game port connection



(81507) **\$79**

Dexxa Steering Wheel

Dexxa® Steering wheel with foot pedals offers extraordinary new levels of control, speed and realism to PC-based computer racing games. With 220 degrees of wheel movement, quick response thumb control buttons and a powerful gear shift lever, you'll be smoking your way through the top racing games.



(69977)

\$93

Wingman® Attack

Entry-level joystick with new, modern design for more performance. WingMan® Attack™ provides versatile grip handle with three action buttons, a rapid-fire trigger and unique Thumb Sweep design for quick button access. A high-precision throttle is mounted on the stable base and provides smooth and accurate power settings.



(81510) **\$45**

Wingman® Formula Force

Nothing's closer to a race car. Immediate-feedback I-Force technology lets you feel the road and everything that happens, and cut your reaction time. Gas and brake pedals feel realistic for fast driving. Use wheel-mounted paddle shifters for fast gear changes, or as programmable buttons for driving in automatic. 1-year warranty



(69366) **\$269**



Soundman G1
Speakers
(81656)

\$79



Dexxa Joystick
USB
(84809)

\$34



Wingman
Gaming
Mouse
(76693)

\$78

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the latest
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Specialists in Sound and Storage

Yamaha CD-RW kits

 2x write
 2x rewrite
 16x read

IMAGE 2216EVK

Yamaha at breakthrough prices!!



Packed in Australia, with full Yamaha Australian warranty. Complete with manual, cables, Adaptec software (Easy CD Creator and PacketCD), CDR and CDR-W disks and screws. 1MB buffer.

Internal E-IDE (81333)

\$359

 4x write
 4x rewrite
 16x read

YAMAHA 4416EVK / SVK

TAKE YOUR PICK, SCSI OR E-IDE!!

With Adaptec Easy CD Creator and PacketCD software, CDR and CDR-W discs, cables, screws and manual.

SVK - Internal SCSI, SCSI card not included (81335)


\$489

EVK - Internal E-IDE (81334)

\$489

 6x write
 4x rewrite
 16x read

YAMAHA 6416SVK

6x recording with CDR, and 4x recording with a CDR-W disc! With Adaptec Easy CD Creator and PacketCD software.

CDR and CDR-W discs, cables, screws & manual. 2MB buffer.

Internal SCSI, SCSI card not included (81336)

\$590

 6x write
 4x rewrite
 16x read

YAMAHA CRW6416SXVK

Adaptec Easy CD Creator and PacketCD software, CDR and CDR-W discs, cables and screws and manual. Original Yamaha external with Yamaha's own regulated power supply. 2MB buffer.

External SCSI, SCSI card not included (81337)

\$726


Yamaha PC speakers

YAMAHA YSTM8B

Compact speaker boxes with dual inputs, head-phone socket and audio output for a subwoofer. Frequency response 80Hz-20kHz. Black (81340):

\$73


YAMAHA YSTMS35D

30 Watt speaker system with subwoofer, with USB or analog connection. (86031) White


\$199

YAMAHA YSTM100

Bookshelf speakers. Wooden cabinets, two way sound. Ymersion surround effect. 40 Watts RMS; provides hi-fi sound. White (81342):

\$232


Yamaha audio quality makes such a difference to your desktop!



YSTM model:	8	S30	S35D	S100	S55D	SW8	SW10
Part Number:	(81339) White	(86029)	(86031)	(81342) White	(81345) White	(81348) White	(81350)
Description:	Full range powered monitor speaker pair	3-piece Satellite / sub system	3-piece Satellite / sub system	Bookshelf PC speaker pair	3-pce powered multimedia speaker/sub. kit	Powered subwoofer	Powered subwoofer wooden cabinet
Watts:	2x5w	30w	2x6w, 18w subw	2x20w	80w, 40w subw	15w	25w
Features:	Ashtonsishly deep bass response	Great sound	Great sound USB	Non-resonant wood fiber	USB, Satellite speakers	Universal compatibility	Incredible audio depth, auto on/off
	\$95	\$139	\$172	\$232	\$280	\$125	\$176
Also available in:	(81340) Black	(86030) Black	(86032) Black	(81343) Black	(81346) Black	(81349) Black	
	\$73	\$139	\$172	\$232	\$280	\$125	

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High performance CD-R/RW drives

RICOH **ATAPI** Internal CD-R/RW Drive MP7060A



Write
CD-R **x6**

Rewrite
CD-RW **x4**

Read **x24**

(79218)
\$599

- Ricoh's MP7060 Series CD-R/RW drives feature: up to 6x recording speed, up to 4x rewriting speed and up to 24x reading speed
- Designed to achieve accurate reading of audio data for high-quality music reproduction
- Strong dust resistance for greater reliability
- Average access time 120msec

- Comes with Easy CD Creator, the professional-level mastering software, and DirectCD 2.5, the software that makes it easy to write files
- Disc At Once, Session At Once (requires additional software), Track At Once, PacketWrite
- Includes one CD-R disc and one DirectCD-formatted CD-RW disc
- 2MB buffer memory

RICOH **SCSI** Internal CD-R/RW Drive MP7060S



Write
CD-R **x6**

Rewrite
CD-RW **x4**

Read **x24**

(79412)

\$685

RICOH

Media

CD-R Discs



Gold: (54770)

\$4

Silver: (81167)

\$3

Silver 5-pack:
(81165)

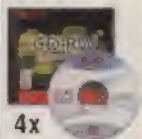
\$16

CD-RW Discs

(55094)

\$28

CD-RW DirectCD Formatted



4x

(74418)

\$17

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See Page 2
for Locations

December
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33

More from Verbatim Internet Mouse



Scroll & side button features. Browse the Web or documents without moving the mouse. Supports Office 97 and Internet Explorer. PS-2 connector and serial port adapter. For MS-DOS 3.3, Win3.1/3.11.95 & NT. (77817)

\$28

Multi-media speakers



Huge 180w PMPO sound. 3D-sound, magnetically shielded. (79567)

\$48

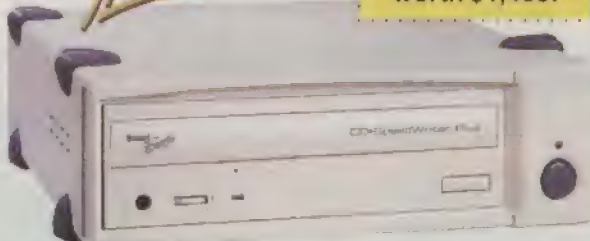
*Scala MM200 is software for creating presentations that move and look as finished as TV - with animations, videos, sound, music, and effects like wipes and fly-ins.

CD-R/CD-RW: Storage for life

SpeedWriter Plus

Smart and Friendly

Bonus software worth \$1,400!



4x Write, 2x ReWrite, 24x Read

CD-R/CD-RW. 4x Write, 2x ReWrite, 24x Read with a plentiful 2MB buffer. Can create a full 650MB CD in as little as 17 minutes! Included: Adaptec Easy CD Creator Standard, PowerQuest Drive Image, Diamond Cut Enhance/CDR, Sonic Foundry CD Architect, Sonic Foundry Sound Forge XP, MediaPath MediaAgent, ECI Disc Inspector Pro, Smart and Friendly CD Consultant.

External SCSI: (78955)

Also available in
Internal IDE:

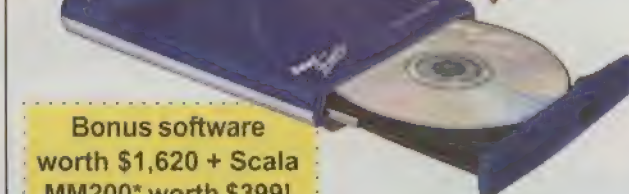
(78954) **\$420**



\$764

CD Pocket RW

Smart and Friendly



Bonus software worth \$1,620 + Scala MM200* worth \$399!

4x Write, 4x ReWrite, 20x Read

Add a CD Recorder to your Laptop!

The Smart and Friendly CD Pocket RW from Verbatim is a truly portable 4x Write, 4x ReWrite, 20x Read CD-Recorder with a plentiful 2MB buffer. Weighing approx 500gms, the CD Pocket RW is designed specifically for mobile professionals. The integrated rechargeable battery pack will write approximately 6 CD's at 4x before requiring recharging. Includes an extensive software suite of today's most popular applications, and a Plug-and-Play PCMCIA host adapter.

(xxxxx) **NEW !! \$1,399**



CD-RW

DataLifePlus® ReWritable blank disc. Extra durable printable surface. 2x/4x speed. 650MB.

Single (77492) **\$13**

CD-R

DataLifePlus® Writable blank disc. Extra durable printable surface. 74 Min. 650MB.

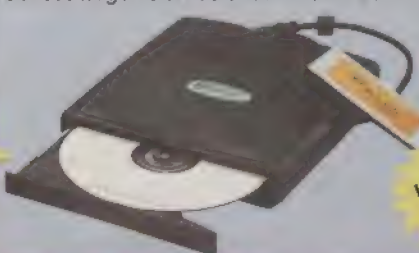
Single (74740) **\$3**
10-Pack (76731) **\$26**

Verbatim 20x PCMCIA Portable CD-ROM Drive

The low profile slim-line tray design of this external CD-ROM drive makes it ideal for mobile applications. Its built in PCMCIA interface allows any Windows based laptop or notebook to access large volumes of CD-ROM data with ease.

(75386)

\$290



DVD
version also
available

Verbatim 56K CompactModem

Compatible with Windows®
CE based Palm PCs and
Handheld PCs

The Pretec CompactModem from Verbatim is the world's first and smallest 56kbps Fax/Modem card for Windows CE based Palm PC and Handheld PC. Video conferencing ready. Supports V.80 application for synchronous H.324 streaming. Supports V.90 and K56flex. Win 95/98/NT/CE compatible. By connecting the CompactFlash adapter included, this modem also becomes a fully-fledged PC card able to be used with most laptops/notebooks.



(83607)

\$292



Compact Flash Memory



Introducing Fly Buys at Harris Technology. See back page.

- Combination of a memory module with a Hard Disk
- Provides a durable, compact, solid state storage card.
- Smart voltage feature. (3.3-5 Volts)

	Part #	\$	Fly Buys.
16Mb ATA Flash Card	(70963)	\$180	✓
32Mb ATA Flash Card	(70965)	\$297	✓
64Mb ATA Flash Card	(70968)	\$472	✓
12Mb Compact Flash Card	(70950)	\$169	✓
16Mb Compact Flash Card	(70951)	\$179	✓
24Mb Compact Flash Card	(70953)	\$259	✓
32Mb Compact Flash Card	(70954)	\$289	✓
48Mb Compact Flash Card	(80242)	\$349	✓
Compact Flash Adapter	(86000)	\$23	✓
16Mb Smart Media Card	(86191)	\$159	✓
32Mb Smart Media Card	(86193)	\$319	✓

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PC Cards



These multi-functional cards satisfy the need for today's mobile computer users to hook up to their corporate and home networks. Portable compact sizes are a fantastic feature of the Kingmax PC Card range of products, making them easy to carry as they weigh less. Plug and Play anywhere, and provide high speed Internet and Intranet access. They comply to the common standards, and run on minimum power standards for power conservation. These cards are high performance products with standard-based technologies.

V.90 Type II Modem	(86004)	\$156
10BaseT Ethernet Type II 16 bit	(85991)	\$79
10/100Base Ethernet CardBus 32bit	(85992)	\$165
10/100Base Ethernet Type II 16Bit	(85993)	\$139

USB Modem, Lucent chip 100% hardware (86005) **\$179**

Networking



NEW PRODUCT

NEW PRODUCT

- Dual-speed Ethernet Smart Switches
- Performance and functionality in entry-level switching.
- Offer high level flexibility and functionality in virtual grouping.
- Rich bandwidth and long distance connection.

5 Port 10/100 Dual Speed Hub Stckble	(85988)	\$229
8 Port 10/100 Dual Speed Hub non Stck	(85989)	\$297
16 Port 10/100 Dual Speed Hub Stack	(86007)	\$559
24 Port 10/100 Dual Speed Hub Stack	(86008)	\$829
16 Port Smart Group Switch Virtual LAN	(86009)	\$1049
24 Port Smart Group Switch Virtual LAN	(86010)	\$1429
10/100 PCI Ethernet Card	(85990)	\$30

PC-133 TinyBGA™ DRAM module, more powerful than previous modules, has amazing functionality

We move the information that moves your world

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Easy CD Creator™ 4 Deluxe

for Windows® 95, 98 and NT 4.0

Put Your World on CD!

Easy CD Creator 4 Deluxe goes way beyond the software that came with your CD-Recorder.

- Easily create data, audio and multimedia CDs on your PC
- Download Internet music, including MP3 tracks, and record to your own CDs
- Back up important files such as spreadsheets and financial data
- Make your own CD labels, covers and inserts
- Create custom music CDs to play in any standard CD
- Send video postcards, share photo albums on CDs that play on any PC - no special software required

(80691)

\$127

SCSI Card 2940U2W

PCI-to-Ultra2 SCSI Host Adapter

Unleash the full potential of your server or workstation!



**Y2K
compliant**

(83687)

\$628

When it comes to boosting the performance of servers and workstations to 80 MByte/sec, Ultra2 SCSI (LVD) from Adaptec is leading the way. So unleashing the full potential of an Ultra2 SCSI solution, with high-performance hard drives and faster processors, is easier than ever. Ultra2 SCSI assures you get maximum performance from both your system and peripherals.

- Faster data access rates up to 80 MByte/sec
- Greater configuration flexibility and scalability with 12 meters of cable
- Operating System Support - Windows NT™ 4.0 & 5.0, Windows® 95, NetWare 3.1X & 4.X, SCO UnixWare 2.1.2, OS/2 Warp 3 & 4, and SCO Unix 3.2v4.2

SCSI Card 2930 Ultra

PCI card for desktop PCs

Boost your CD-Recordable or Jaz drive to its best performance!



**Y2K
compliant**

(83689)

\$199

Ideal for SCSI CD-R, CD-RW (rewritable CD-ROMs), DVD, or removable drives.

- Gain Ultra SCSI speed: 20 MB/sec data transfer rate
- Save time with multitasking
- Achieve broadest compatibility
- Connect up to 7 SCSI peripherals with one card
- Manage peripherals with Adaptec® EZ-SCSI® software (Included)
- Operating System Support - Windows NT®, Windows® 95/98, Windows® 3.1, DOS

Pricing might change after going to print, so please call for the latest pricing or visit the Web Direct Link. And why not register on-line for even better pricing?

Delimited

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For all your Data Storage

Travan Backup Kits

4/8GB Internal IDE


STT28000A-RFT
(27274)

\$434

4/8GB Internal SCSI


STT28000N-RFT
(56140)

\$482

10/20GB Internal IDE



light blue bg

STT220000A-RFT
(76253)

\$650

12/24GB SCSI DDS-3

Internal


Seagate DAT BackUp Drive:
STD224000N/SB
(56150)

\$1,920

Hard Drive Upgrade Kits



What's in the Box?

5,400 - RPM MEDALIST drives bring multimedia performance and high capacities at an exceptional value.

- ◆ Seagate Ultra ATA Hard Drive
- ◆ Frame kit, mounting, brackets and drive screws
- ◆ Antistatic wrist strap
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- ◆ ATA transfer rates up to 66.6 Mb per second with Ultra ATA
- ◆ Seek times as fast as 11 msec
- ◆ Designed for Pentium PC's
- ◆ 3 Year Warranty



ST34311A-R

4.3GB
\$249

(83125)



ST313032A-R

13.2GB
**PRICE
DROP**
\$380

(76896)



ST38421A-R

8.4GB
\$336

(86054)



ST317242A-R

17.2GB
\$425

(76897)

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AF100L for
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Monitors
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AF100XL for
16-18"
Monitors
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Scotch™ CD Essentials

Scotch™ Laser Lens Cleaner for CD and CD ROM Player AV-101

- Best results of any CD Laser Lens cleaner tested, optimises sound
- 'On disc' recording guides you
- Cleans all CD format hardware

(85918) **\$34**



Scotch™ CD and CD-Rom Clean Wipes and Spray Cleaner AV-115

- Easy to use cleaner removes oily fingerprints, dust and dirt
- Helps prevent skipping and mistracking

(85919) **\$22**



Scotch™ CD and CD-Rom Surface Scratch Remover Kit AV-116

- Helps stop skipping and sound drop out caused by minor scratches on CD's or CD-ROMS
- Polishes CD's and CD-Roms to help repel dust

(85920) **\$36**



Notebook Privacy Filters

From the side a passerby can only see a blank dark screen. 3M's patented micro-louver technology makes notebook on-screen data visible only to you when sitting directly in front of your notebook. Plus it stays in place even when your notebook is closed and is easy to attach and remove. Three sizes - (12.1" - 13.3" and 14.1")

More privacy.

More protection

Won't blur or distort images

Purchase a 3M Privacy Notebook Filter and (86119) receive a Post-it® and Scotch™ Personal Organiser Accessories. Perfect for the mobile office on the go!

(86120) 13.3" - **\$129** (86121) 14.1" - **\$139**



New! Keep secrets **SECRET!**
from **\$119**

Complete and return this coupon to 3M with a barcode from your 3M Computer Filter and receive a free Post-it® and Scotch™ Personal Organiser Accessories.

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Pymble NSW 2073

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DRAMATICALLY DIFFERENT High Performance Graphics

Editors'
Choice

Matrox
Millennium
G400 has
received the
Editors' Choice
Award
from APC, PC
Authority, PC
Magazine
August and
September
1999



**Matrox
Millennium G400**

The G400 series is the next generation of graphics acceleration cards from Matrox. The G400 enables Matrox to offer superb games performance as well as the speed, image quality and multimedia ability that has made Matrox the choice of demanding PC users. The G400 is an extremely fast graphics accelerator with the MAX version in the series offering even faster performance and a 360 Mhz DAC for ultra crisp display at high resolutions. **G400 - Extreme Speed Plus:**

- Environment mapped bump mapping - a sensational 3D feature. Only card to support this!
- DualHead models runs x2 monitors from the one G400 card
- Amazing! Look at www.matrox.com/g400/applications/dual/home.htm for many interesting uses
- Stunning on screen visual quality
- Offers excellent DVD and TV out ability
- Upgradable to video capture & video editing (TV, VCR, PC output)



G400 Dual Head 32MB RAM

(78103) **\$415**

G400 Dual Head 16MB RAM

(78105) **\$329**

G400 Max Dual Head 32MB RAM

(78106) **\$485**

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TECHNOLOGY™**

Pricing** and specifications herein are subject to change without notice



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DVD & Storage solutions for everyone



Only the finest manufacturers have been selected for these premium quality products. Designed with the ultimate hardware and software for trouble free performance, the DVD and Storage Solutions are simple to install and easy to use.



PRO-KIT

CD Mirror Server

The PRO-KIT Tower 2 is the latest breakthrough in CD/DVD networking and Network Attached Storage technology.

Access up to 44 full CD's
across a 10/100 network!

Features:

- Store up to 44 "full" CD images at one time
- Full support for both CD and DVD media formats
- Advanced high-speed CPU architecture delivers up to 7Mbytes/sec (on 100 Mbit network)
- Neat and compact - No bulky CD-ROM stacks



(86053)

\$4,235

PRO-KIT

SCSI 8x20 CDR Kit

- Internal Panasonic Drive
- AdvanSys PCI SCSI Controller card
- Adaptec Easy CD Creator Software
- 2 blank media
- Audio and data cables
- Quick Installation Guide

EXTERNAL KIT ONLY:

- Sturdy self-contained external enclosure for recording stability



NEW

Internal Kit:
(79007)

\$645

External Kit:
(79008)

\$779

**20x Read
8x Write!!**

HITACHI

DVD RAM

FOR MASSIVE DATA STORAGE

DVD RAM gives you massive storage capabilities. Great for storing large amounts of documents, images and archiving records. Hitachi are the leaders in DVD RAM.

- Internal SCSI DVD drive
- Massive data storage: 5.2GB per media, re-writable
- Backwards compatible
- Reliable storage method
- Includes 1 blank DVD RAM media
- Includes archiving software



(58069)

\$1,099



MAXELL DVD RAM MEDIA

- 5.2GB double sided DVD RAM media
- Re-writable up to 100,000+ times

(75383)

\$134

PRO-KIT

Hardware Decoder

FOR UPGRADING PC'S

- Pioneer DVD-ROM Drive (32x CD-ROM)
- Microsoft Encarta 99 DVD Reference Suite
- PCI MPEG-II decoder card
- Audio and data cables
- Quick Installation Guide



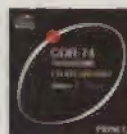
NEW

(79009)

\$475

**Now
with MS
Encarta 99
DVD !!**

Media



**Princo
Blank
CD-R**

74 minutes

(74357)

\$3



**Princo
Blank
CD-R**

80 minutes
for full audio
duplication

(73157)

\$3

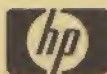


**Princo
Blank
CD-RW**

74 minutes
rewritable

(74397)

\$7



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for details.

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advantage
of the
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Warranty
Upgrade!**

HP offers an upgrade warranty from the standard 1 year warranty to 3 year warranty on the LaserJet 2100 Series, LaserJet 4050 Series and LaserJet 8100 Series, when you purchase one of these printers between 01/09/1999 and 31/12/1999. Call for details.

HP Laser Printers

See www.ht.com.au/cat/hp
for toners, inks, papers etc.

HP LaserJet 1100 Printer

HP's JetPath technology allows you the flexibility to expand the LJ 1100 into an all-in-one performer when your business needs grow. Crisp, sharp 600dpi laser printing. 8ppm. 2MB RAM.

(70095) **\$789**



HP LaserJet 1100A Printer-Copier- Scanner

If your current business needs require the LaserJet 1100 with copying & scanning capabilities, move up to the LaserJet 1100A.

Printing, copying and scanning: all-in-one. Make laser copies at the touch of a button, even without the PC turned on. Scan resolution 600dpi enhanced, 300dpi optical.

(70096) **\$925**

HP LaserJet 2100 Series

All models feature:

- 1200dpi resolution
- 10ppm print speed
- 60MHz processor
- 350-sheet capacity
- 15,000 page monthly duty cycle
- Excellent performance

LaserJet 2100 A fast flexible laser with room to grow. EIO, PCL 6, 4MB RAM.

(72291)

\$1,345

LaserJet 2100M A fast flexible laser with PS and PCL. EIO, PCL 6, 8MB RAM.

(72292)

\$1,620

LaserJet 2100TN A complete network printer. EIO, PCL 6, 8MB RAM, additional 250-sheet feeder, HP JetDirect print server installed.

(72293)

\$1,910



HP LaserJet 5000

Prints A3, 16 ppm, 100MHz, 1200dpi, 4MB From (60548)

\$2,749



HP LaserJet 8000

Print/duplex A3, 24ppm, 133MHz, 1200dpi, 16MB From (60551)

\$4,578

HP 2000 Series



Business performance with break-through colour print speed. Black: 600dpi, 10 ppm. Colour: PhotoREt II, 4ppm. Low printing costs. Four individually replaceable ink cartridges. Outstanding print quality. 5,000 pages monthly duty cycle. 2MB RAM.

2000C Excellent colour print quality for a great price!

(69484) **\$929**

2000CN Network ready, additional 250 sheet paper tray

(69485) **\$1,649**

HP Professional Colour InkJet Printers



HP 2500 Series

Fast, brilliant colour printing for the workgroup. **A3 capable**. Black: 600dpi, 9ppm. Colour: 3.5ppm. Rugged and robust. Low cost per page. 4 individually replaceable ink cartridges. Versatile media handling. 12,000 pages monthly duty cycle.

2500C Adobe PostScript 3 optional, 4MB RAM (70725)

\$2,045

2500CM Network ready, Adobe PostScript 3 standard, 20MB RAM

(76060) **\$2,998**

HP Colour LaserJet 4500 Series

Delivers high quality 600dpi colour graphics. 16ppm mono, 4ppm colour. 32MB RAM. 133MHz processor. First page out in 26sec for black text and 36 seconds for full colour. 900 pages paper input. Superior network management. Double-sided printing. Automatic overhead transparencies sensing. Exceptional reliability. Cost-effective. Improved paper handling. From:



**Stunning
print
quality!**

(70356) **\$5,340**

December
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40

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Several finance methods
available, subject to approval

Business Laser Printing

Phaser 740 Laser Printer



Should I get a black & white or colour printer? Yes.

740L: Incredibly affordable high-performance black & white laser printer, colour capable. Step up to colour by simply adding the Colour Upgrade Kit.

Never Say Never...

740: Affordable colour laser printer with extraordinary print quality. For breathtaking images that leap off the page, at a breakthrough colour laser price, look to the Phaser 740. That way, you'll never have to compromise.

Both printers feature: 10BaseT for network-ready printing right out of the box • No developers or other special components that need regular service • Adobe Postscript 3

Model	740L (71835)	740 (71836)
Full colour printing	add colour kit	standard
Max resolution black/colour	1200dpi/-	1200dpi/600dpi
Ram Standard/Max	16MB/256MB	32MB/256MB
Image processor	133MHz	133MHz
Print speed black/colour	16ppm/-	16ppm/5ppm
Pipeline printing	optional	optional
Duplex	manual auto	standard optional
	\$3,678	\$4,714

Phaser 840 Colour Printer

The Phaser 840 solid-ink colour laser printer is a winning combination of easy to use, cost-effective colour printing, quality, and staggering colour print speeds.

Set up is breeze with its "plug-and-print" right-out-of-the-box design.

And... **free black ink** means you can add colour to documents and still keep the same low cost-per-page as a monochrome laser printer. Colour is now affordable!



Model	840N (71839)	840DP (71840)	840DX (71841)
Resolution	1000dpi	1200dpi	1200dpi
RAM Standard/Max	32MB/128MB	64MB/128 MB	128MB/128MB
Built-in Hard Disk	Optional	Optional	2GB
RISC Processor	133MHz	133MHz	133MHz
Speed High Res/Photo	-	2ppm	2ppm
Pipeline Printing	Optional	Standard	Standard
Job Accounting	50 Jobs	500 Jobs	5,000 Jobs
Duplex Built-in Auto	Optional	Standard	Standard
Paper Tray 200-sh	Standard	Standard	Standard
Tray 500-sh each (2)	Optional	Optional	Standard (one)
	\$5,733	\$7,285	\$9,780

Visit the Web Direct Link for the latest pricing, availability and information on Tektronix products. And why not register on-line for even better pricing?

Also available: Tektronix **A3** colour lasers!
Great value from only **\$10,970** (23071)

For Phaser 740:

Black toner
(6,000 pg)
(71854)

\$197



C,M or Y toner
(71855,
71856, 71857)

\$386

For Phaser 840:

Colour Ink
Sticks (C,M or
Y) 2-pack
(71872,
71873, 71874)

\$179



5-pack
(71869,
71870, 71871)

\$399

Paper Tray
(71905)

\$234

For Phaser 740, 840 Compatible:



16MB Memory
(71844)

\$160

32MB Memory
(71845)

\$207

64MB Memory
(71846)

\$708

Printers that mean Business

Sharp colour ... Sharper prices ...

Why pay more than you have to when QMS gives you desktop colour laser printing from only **\$2,995** (83652)

MagiColor 2 DeskLaser



16ppm
mono

4 ppm
colour

Standard
Ethernet



\$2,995

(83652)

MagiColor 2 DeskLaser with Duplex



16ppm
mono

4 ppm
colour

Standard
Ethernet

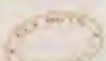
Duplexing
unit

\$5,695

(83653)

Why QMS?

The Magicolor range from QMS comprises nine different models incorporating features such as oversized-A3, PostScript, and auto duplexing. Within the Magicolor range there is a printer available to suit your individual needs. The outstanding advantage of the Magicolor 2 DeskLaser range is that you don't need to pay thousands of dollars for costly add-ons that you don't require. The Magicolor 2 DeskLaser range utilises the power of Windows to produce 16 pages per minute in monochrome and 4 pages per minute in colour, prints at 600 x 600 dpi, has 24 MB RAM, ships with ethernet as standard and has the option to automatically duplex. These printers are an ideal investment for emergency/short run brochures, sales proposals, presentation, company reports, letters, etc.



Fly Buys.

Collect Fly Buys points on your Computer Hardware & Software when you Purchase from Harris Technology. Details on Page 64.

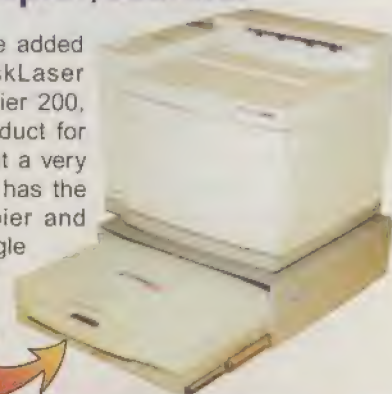
Turn your colour laser into a colour photocopier for only \$840 with the QMS ScanCopier 200 digital copier/scanner



\$840

(83589)

Colour copying capability can be added to the QMS Magicolor 2 DeskLaser printers with the QMS ScanCopier 200, giving users a very flexible product for printing and copying, in colour, at a very affordable price. Its control panel has the familiar look of a normal photocopier and copying is performed at the touch of a single button. The QMS ScanCopier 200's flatbed scanner can be simultaneously connected to a PC, enabling it to operate as a full function digital scanner as well as a digital copier.



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New Scanner Range Release!

Most compact, lightweight flatbed scanners available!

- Silent & fast scanning
- Super slim & compact
- Plug & Play
- 36-bit
- Fully integrated software package

NEW!



FB-330P Parallel.
Optical resolution
300x600dpi.

(83661) **\$167**

FB-630P Parallel.
Optical resolution
600x1200dpi.

(83673) **\$238**

FB-630U USB to suit Win98/
iMac/Mac G3. 600x1200dpi opt.
res. One-touch scan button.

(83685) **\$238**

New from Canon is this range of stylish flatbed scanners, offering the cutting edge in technology. They are the most compact, lightweight flatbed scanners available on the market today: barely larger than an A4 sheet and only 39mm high, they are sure to fit on any desk. Offering improved resolution and colour recognition, these new scanners come with a complete 'out of the box solution', including a fully integrated and updated software package.

**Canon
BJC-
5000**



**A3
capable**

**1440x
720dpi**

Dual Ink
Cartridge
system.

High Resolu-
tion,
1440x720dpi
printing and 7
colours.

Prints up to A3.

Great for full
bleed A4!

Print speed:
black 7.5ppm,
colour:

2.85ppm.

PhotoRealism®
Technology to
reproduce all
the subtle
nuances of a
picture, right
down to the
very light
shades. Prints
transparencies,
high resolution
paper, T-shirt
transfers etc.,
even prints
banners.

(20756)

\$355



NEW!

Canon LBP800 Personal Laser Beam Printer

Compact desktop laser with face up or down paper delivery, 125 page Multipurpose tray and single sheet Manual Feed Slot. Comprehensive job control via Canon Advanced Printing Technology (CAPT) driver software including Match Paper Size, Multipage per Sheet, Collate, Form Overlay, Customer Paper Size, Toner Saver and Automatic Image Refinement modes.

8ppm • 300x300dpi, 600x600dpi and 2,400dpi with
text and line smoothing • 512K buffer • 2,500 pages per
cartridge (5% cover) • Drivers available: Windows® 95,
98 and NT 4.0.

Great price!

(83787) **\$587**



BJC-265SP (76009) **\$147**

Super performance bubble jet printer. Image optimiser setting reduces jagged edges and faded colours. Super Economy mode: cartridges deliver up to 400 pages in colour, 2400 in black. Up to 4ppm in black, up to 0.3ppm colour. Banner printing capable. Optional black, PhotoRealism and fluorescent cartridges available.



BJC-2000SP (80926) **\$187**

Compact new design for printing ease. Drop-in loading system makes changing cartridges a snap. High-quality photos and text - smooth tonal gradation. 720x360dpi. Optimised gradations for more natural looking images. Smooths jagged edges of low resolution graphics. Instant conversion into a scanner with optional scanner cartridge.



BJC-6000 (79220) **\$475**

High Quality: At 1440 dpi, printouts appear crisp, with razor sharp images and silky smooth tonal gradation. Smooth gradation between dark and light sections. Separate ink tanks: only change the colour you use up. Six colour printing ensures photo quality. 8ppm black, 5ppm colour. Smart Ink Level Detection. Optional USB cable.

**Separate
Ink Tanks.
1440dpi.**

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43

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**Do you want
Fly Buys with
that?**

Makes bright ideas look brilliant

EPSON STYLUS™ COLOR 460 (84928) **\$257**

The perfect introduction to color printing for the home user.

- Affordable, yet versatile 720x720dpi, four colour printer – ideal for the home.
- EPSON's PhotoEnhance 4 technology allows you to analyse digital images and enhance them for the best final output. This means customers can ask the printer driver to enhance the final print image – without affecting the original file.
- Automatic Mode in the printer driver software selection. The colour and print quality is adjusted automatically to achieve optimum results, regardless of what is being printed or the type of paper being used.
- Print photos & cartoons onto t-shirts using EPSON's Iron-On Transfer Paper. Imagine.. Customised gifts!
- Poster tiling function. The printer driver divides the image into a number of 'tiles' and prints across multi-pages that join to make a poster. You can choose to print posters using 4, 9 or 16 A4 pages.
- On-Line, animated documentation on CD-ROM with helpful hints.



Cartridges for
EPSON Stylus
Colour
Printers
featured on
this page...

Black Ink for
EPSON
Stylus
460 & 660
\$37
(70948)

Black Ink for
EPSON
Stylus
760 & 860
\$45
(70091)

Colour Ink for
EPSON
Stylus
460, 660,
760 & 860
\$44
(70092)

STYLUS™ COLOR 660

\$320

(84929)



- 1440 x 720 dpi
- EPSON's PhotoEnhance 4 technology
- EPSON's Exclusive PerfectPicture imaging system
- Photo quality for home or office
- Watermarking capability

STYLUS™ COLOR 760

\$520

(84930)

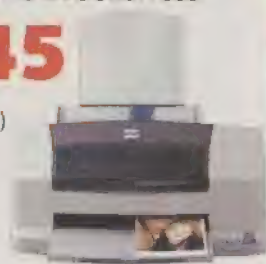


- 1440 x 720 dpi
- Combines EPSON's Advanced, Variable-Size Droplet Technology and Ultra Micro Dots with EPSON's award winning PicturePerfect imaging system.
- 1440 x 720 even on PLAIN PAPER

STYLUS™ COLOR 860

\$645

(84931)



- Targeted for business and professional graphics users wanting maximum colour output combined with speed and affordability.
- 1440 x 720 even on Plain Paper.
- Parallel and USB Ports for easy setup.
- Printouts virtually indistinguishable from a photo.

EPSON Perfection 610

(85785) **\$324**



An entry level scanner ideal for the home, SOHO or small business. So easy to use! Press the "Start" button on the scanner and it will launch the application and scan the image.

• 36-bit, 600 x 2400 Optical Resolution • NewSoft Presto! PageManager for one button scanning • Adobe PhotoDeluxe • USB connection for easy setup • EPSON's Micro-Step Drive Technology for maximum hardware resolution • EPSON's Advanced CCD and lens for edge-to-edge sharpness and clarity.

EPSON Perfection 1200

(85784) **\$550**



36-bit 1200 x 2400 Optical scanner. Featuring EPSON's ColorTrue Imaging System the Perfection 1200 integrates hardware, optics and processing technologies to give detailed and accurate images.

• Xerox TextBridge Classic OCR Software • Adobe PhotoDeluxe • Adobe PageMill • Create your own web pages • NewSoft Presto! PageManager • EPSON's TWAIN 4 • EPSON's Advanced CCD and lens for edge-to-edge sharpness and clarity. • USB for easy setup.

HP DeskJet Printers and All-In-One Series

NEW!

HP DeskJet 610C

Sharp blacks & rich colours on a budget

Optional Photo Cartridge for photo-quality colour. Easy to use.

(80426)

\$247



NEW!

HP DeskJet 830C

Smudge resistant, fast drying inks

Prints stickers, labels, photo paper, iron-ons, banners etc.

(83456)

\$392



HP DeskJet 970Cxi

2400dpi on photo paper!

PhotoREt III for more shades of colour. Automatic two-sided printing.

(84363)

\$780



NEW!



HP Colour Copier 170:

As affordable as an ordinary black & white copier!

Fast, convenient photo-quality colour and outstanding black & white copies. Special

features: Super-Zoom (24-400%), Clone, Poster, Auto-fit, Reverse (for iron-ons), 2-on-1 (two originals onto one page). 600x600dpi optical black and PhotoREt II colour copying. Up to 99 continuous copies, up to 11cpm mono, 8.5cpm colour.

(84894)

\$940

HP DeskJets	610C	810C	830C	880C	895Cxi	970Cxi	1120C
Speed Black	5ppm	6.5ppm	8ppm	8ppm	10ppm	12ppm	6.5ppm
Speed Colour	2.5ppm	4.5ppm	5ppm	5ppm	6ppm	10ppm	4.5ppm
Resolution Black	600dpi	600dpi	600dpi	600dpi	600dpi	600dpi	600dpi
Resolution Colour	600x300dpi	PhotoREt II	PhotoREt II	PhotoREt II	PhotoREt II	PhotoREt III	PhotoREt II
Monthly Volume	1000	1000 pages	1000 pages	2000 pages	3000 pages	5000 pages	3000 pages
Input Capacity	100 sheets	100 sheets	100 sheets	100 sheets	100 sheets	150 sheets	150 sheets
Envelope Input	20	15	15	15	15	15	15
Network Capable	no	no	no	no	yes	yes	yes
Connectivity	Parallel	Parallel & USB	Parallel & USB	Parallel & USB	Parallel & USB	Parallel & USB	Parallel
Part number	(80426)	(77961)	(83456)	(72920)	(70705)	(84363)	(56298)
Price	\$247	\$345	\$392	\$479	\$633	\$780	\$788

HP OfficeJet T45

(84356)

\$975

NEW!

Prints, copies, scans and faxes - all in colour!



HP OfficeJet R65

(80322)

\$1,640

Prints, copies and scans - all in colour!



HP LaserJet 3100

(58566)

\$1,399

Prints, copies, scans and faxes - mono



HP All-in-Ones	OJ 635	OJ 725	OJ T45	OJ T65	LJ 3100	OJR45	OJR65
Print Speed Black	5ppm	5ppm	9ppm	11ppm	6ppm	11ppm	11ppm
Print Speed Colour	2ppm	2ppm	6.5ppm	8.5ppm	-	8.5ppm	8.5ppm
Print Resolution Black	600dpi	600dpi	600dpi	600dpi	600dpi	600dpi	600dpi
Print Resolution Colour	600x300dpi	600x300dpi	PhotoREt II	PhotoREt II	-	PhotoREt II	PhotoREt II
Fax/PC Fax Memory	65 pages	65 pages	55 pages	75 pages	150 pages	-	-
Fax Speed Dials	100	100	75	100	175	-	-
Maximum Copies	99	99	99	99	99	50	99
Copier Zoom	50-200%	25-400%	50-200%	25-400%	50-200%	25-400%	24-400%
Scan Resolution Enh.	1200dpi	1200dpi	300dpi	300x600dpi	600dpi	9600dpi	9600dpi
Scan Resolution Opt.	300dpi	300dpi	1200dpi	1200dpi	300dpi	600x2400dpi	600x2400dpi
Scan Bit Depth	24-bit	24-bit	24-bit	24-bit	256 levels grey	30-bit	30-bit
Paper Capacity	100 sheets	150 sheets	100 sheets	100 sheets	100 sheets	100 sheets	100 sheets
Auto Document Feeder	Yes	Yes	Yes	Yes	Yes	No	Yes
Part number	(55544)	(80568)	(84356)	(84893)	(58566)	(80302)	(80322)
Price	\$667	\$795	\$975	\$1,169	\$1,399	\$1,449	\$1,640

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E-mail sales@ht.com.au

**See page 2
for locations**


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Transparency adapter for SnapScan 1236s. Moving light source. 203x254mm. (76779)

\$399

Document Feeder for DuoScan T1200. (75581)

\$458

Document Feeder for SnapScan 1236s (82625)

\$405

Batch Slide holder set for DuoScan T1200. (75582)

\$238


DuoScan T1200 SCSI-2. 36 bit. Transparency scanning. Opt. res. 600x1200ppi (74498)

\$1,315


DuoScan T2500 SCSI-2. 36 bit. Transparency scanning. True opt. res. 1250ppi (74499)

\$8,185

Call for pricing on Snapscan 1212p, DuoScan T200XL, and ePhoto 1680.

Making images work for you

SnapScan Touch


NEW!

(74495)

\$249

Agfa's revolutionary SnapScan Touch USB Scanner has four programmable buttons: scan direct to file, email, fax or printer. 600x1200 ppi, 36 bit, landscape desktop scanner. Comes with 7 translucent coloured handles! Software: Agfa ScanWise, Caere OmniPage LE OCR, & more.

SnapScan 1236s



(74497)

\$385

One pass, high quality 600x1200ppi scanner (9600ppi max.) with SCSI-2 interface. 36 bit colour. Includes Omnipage LE OCR, PaperPort, iPhoto Express, Color-It and Foto-Look software. Compatible with Win3.x/Win95/98/NT.

SnapScan 1236u



(84306)

\$359

One pass, high quality 600x1200ppi scanner (9600ppi max.) with SCSI-2 interface. 36 bit colour. Comes bundled with Caere OmniPage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Compatible with Win98, USB technology.

SnapScan 1212u



White: (74496)

\$258

One pass, high quality 600x1200ppi scanner (9600ppi max) with USB interface. Includes Caere Omnipage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Compatible with Win98 & USB Technology.


NEW!

(84305)

\$445

ePhoto 780c

The new metallic blue ePhoto 780c is an exceptionally fast point-and-shoot digital camera. With a resolution of 1024x768 with Agfa's Photo-Genie, this camera is ideal for the home or office. 1.8" colour LCD with optical viewfinder. 2MB SmartMedia card included. 4 flash modes and self timer.



(81626)

\$855

ePhoto CL30

Compact, simple to use, mega-pixel digital camera with USB interface and a resolution of 1440x1080 pixels. 4MB CompactFlash included. Features a 1.8" colour LCD screen, and Auto focus lens with 2x digital zoom and macro. 4 flash modes.



(76793)

\$1,635

ePhoto CL50

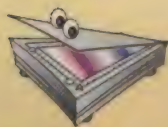
Digital camera with built-in microphone for adding up to 10 seconds of voice or sound per image. Resolution 1600x1200 pixels. 3x optical, 2x digital zoom. Optical viewfinder and 2" LCD screen. Burst mode: hold shutter for continuous shots. The included 8MB card stores up to 96 photos.



Blue or Green: (75577/75578)

\$267

Now available in white, blue and green!



New smart scanners for sharp results

HP ScanJet 3300C

Photo scanning, text recognition, copying

Scan or copy at the touch of a button. USB port. Save, print, or send your scan to your selected application.

NEW!


HP ScanJet 5200C

Fast performance scanner

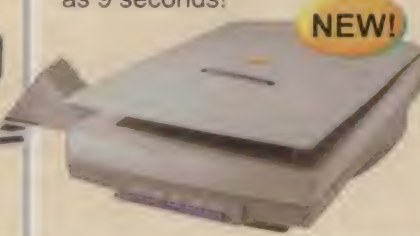
Excellent image quality. Flexible connectivity options. Optional: 35mm slide adapter, automatic document feeder.



HP ScanJet 6300C

Super fast!

For professional results. Five buttons: Scan, copy, e-mail, fax and file. Share your scanner on your Windows-compatible network. Scan photos in as little as 9 seconds!

NEW!


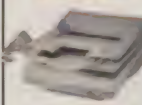
3200C



4200C



6350C



6390C



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HP ScanJet Family	3200C	3300C	4200C	5200C	6300C	6350C	6390C
Resolution Optical	600dpi	600dpi	600dpi	600dpi	1200dpi	1200dpi	1200dpi
Resolution Enhanced	9600dpi	9600dpi	9600dpi	9600dpi	999,999dpi	999,999dpi	999,999dpi
Scan Bit Depth	30bit	36bit	36bit	36bit	36bit	36bit	36bit
Interface Standard	Parallel	USB	USB	USB/Parall.	USB	USB	USB/SCSI
Interface Optional	-	-	-	-	SCSI	SCSI	-
Suits Windows	95/98	98	98	95/98/NT	95/98/NT	95/98/NT	95/98/NT
35mm Slide Adapter	No	No	No	Optional	Yes	Yes	No
Active Transparency Adapter	No	No	No	No	No	No	Yes
Auto Document Feeder	No	No	No	Optional	Optional	Yes	Yes
Part Number	(74116)	(81725)	(74117)	(74118)	(81726)	(81727)	(83227)
	\$185	\$259	\$299	\$459	\$999	\$1,095	\$1,859

Digital photography. No PC. No hassles.

HP PhotoSmart P1000 & P1100 Printers

High performance printing of digital photos, without using a PC!

NEW!


Download digital images directly into the printer! Simply insert the memory card, decide on the photo size, number of copies and print. No PC. No hassles. The PhotoSmart printers are also excellent for everyday print jobs like letters, reports, presentations etc. Up to 2400x1200dpi with HP PhotoREt 3! • 8MB RAM • Parallel, USB (Windows only) interface • Supports Win95/98 and NT

P1000: 11ppm black, 8.5ppm colour.

(xxxxx)

\$Call

P1100: 12ppm black, 10ppm colour.

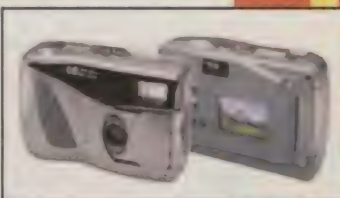
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Automatic Two-sided printing.

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Takes digital photography to a new level in quality!



1 Megapixel (1152x872 pixels) • 2x digital zoom • Colour 1.8 inch LCD • 8MB CompactFlash Card (capacity of 80 basic, 40 fine, 22 superfine photos) • Supports Win95/98 and NT • 9 pin serial (RS-232) interface for fast picture transfer • Video cable for TV connect • Flash • Self-timer • HP PhotoSmart C200 Photo Imaging software

C200 (xxxxx)

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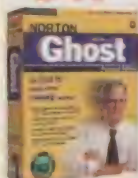
Look for the Cash Back coupon, stickered on the box. Send in the coupon with your receipt of purchase to Symantec. Symantec will rebate by cheque. Promo ends 31 December 1999.



Norton
CleanSweep
2000 4.7
(81110)
\$65



Norton 2000
2.0 (81109)
\$47

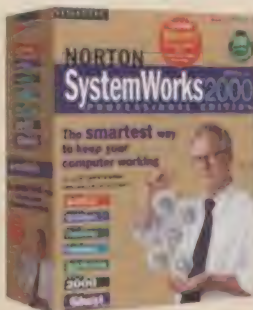


Norton Ghost
Personal Ed.
(78908)
\$118

Symantec
WinFax Pro 9.0
(67201)
\$125



Symantec
pcAnywhere 9.0
(78910)
\$199



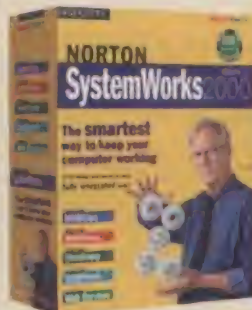
\$179

That's only \$129 after
Cash Back! (81112)

Norton SystemWorks 2000 3.0 Professional

Fully-integrated and market-leading utility suite with advanced tools for PC experts. Contents: Norton AntiVirus 2000 6.0, Norton Utilities 2000 4.5, Norton CrashGuard 2000, Norton CleanSweep 2000 4.7, Norton Web Services, Norton 2000 (Year 2000 readiness), Norton Ghost (disk/file cloning) plus free Bonus Pack: Norton Secret Stuff, WinFax Basic Edition, Visual Page and Zip-It.

\$50 Cash Back



\$139

That's only \$109 after
Cash Back! (81111)

Norton SystemWorks 2000 3.0 Standard

Everything you need to keep your PC running smoothly. Includes Norton AntiVirus 2000 6.0, Norton Utilities 2000 4.5, Norton CrashGuard 2000, Norton CleanSweep 2000 4.7, and Norton Web Services. Great value!

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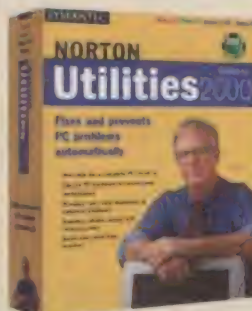
\$90

That's only \$70 after
Cash Back! (81107)

Norton AntiVirus 2000 6.0 Gold

The #1 Anti-Virus software. Easy automatic online updates. Includes new and improved features like: clear, easy-to-understand instructions on how to proceed when a virus is detected. Choose the folders or directories to scan. Scans incoming email attachments automatically. Eliminates viruses hidden in multiple compressed layers. And much more!

\$20 Cash Back



\$92

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Cash Back! (81108)

Norton Utilities 2000 4.5

Helps you solve even the most complicated PC problems quickly and easily. Take advantage of full-time background protection, or use the one-button checkups and easy-to-use wizards. Diagnoses both software and hardware problems to help you keep your entire system running at peak performance. Checks every major part of your computer. Optimises your PC to run at peak efficiency.

\$20 Cash Back



(82773)

\$169

Symantec ACT! 2000 5.0

The award-winning leader in contact management software. Gives you instant access to detailed contact and account information, plus a complete history of your contact-related communications and help with managing your schedule efficiently. Integrates seamlessly with email, fax, word processing, expense tracking etc. Search for information on any contact by name, address, phone number, or other fields. Link ACT! to your Palm Pilot. Includes expert sales assistance from Dale Carnegie Training®. Forecast and track sales opportunities. And much more!



(82654)

\$173

Symantec TalkWorks Pro 3.0

Brings professional voicemail and fax messaging to home offices and small businesses. Keeps you in touch with your customers 24 hours a day! Set up separate mailboxes for employees. Share a single voice modem and phone line across your entire business. Get notification when a voicemail or fax message arrives. Create reports of incoming and outgoing calls. Fax on demand. Enjoy the full functionality of WinFax PRO™. And much more.

December
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- Drag and drop files to appropriate directories
- Create a slide show with sound from selected graphics
- Install bitmap files as Windows wallpaper
- Print files or the thumbnails themselves as a catalogue
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- Create Web pages for your images with an easy to use 'Web Wizard'
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- Find similar images



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\$125

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10 User Licence	(81019)	\$789
25 User Licence	(81020)	\$1,869
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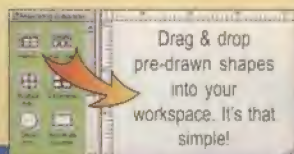
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Visio

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licence pck:
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(49422)

Visio 5.0 Enterprise

10 User:
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(72085)

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(81306)

\$340

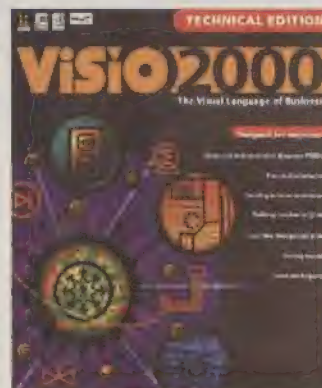
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Visio® 2000 Standard Edition is the fastest, easiest tool for creating professional business diagrams. It's ideal for making flowcharts, organization charts,

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(84597)

\$669

Visio 2000 Technical

The leading tool for creating precise 2-D technical diagrams and drawings.

Visio 2000 Technical Edition is faster than CAD for anyone who needs to: Create and share 2-D technical drawings and diagrams, including HVAC designs, electrical schematics,

process plant layouts, and other 2-D diagrams that incorporate large numbers of predefined, connected symbols; or Work with Autodesk AutoCAD drawing files, including viewing, redlining, and annotating them; assembling SmartShapes symbols on top of inserted DWG backgrounds; or incorporating DWG drawings into technical documentation, presentations, and proposals. The key is Technical Edition's SmartShapes technology—more than 4,000 intelligent shapes designed to behave like walls, pipes, valves, pumps, and other real-world objects. With little or no training, engineers can assemble drawings by dragging and dropping these industry-standard shapes onto a page.

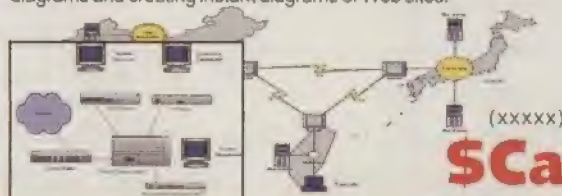


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Visio 2000 Professional Edition is the market leader in IT diagramming software, delivering acclaimed, industry-standard content and tools for rapidly producing network, database, and software diagrams. Professional Edition is designed for IT professionals who need fast, efficient solutions for designing high-level LAN/WAN network topologies and directory service hierarchies, visualising proposed and existing database structures, documenting software projects with UML diagrams and creating instant diagrams of Web sites.



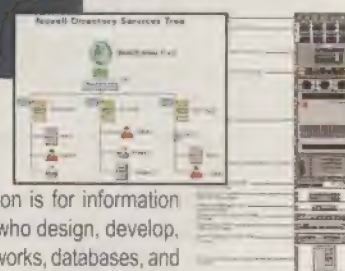
\$Call



NEW!

Visio 2000 Enterprise

The complete solution for automated IT design and documentation



(xxxxx)

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Visio 2000 Enterprise Edition is for information technology (IT) specialists who design, develop, document, and maintain networks, databases, and software applications. Using the in-depth, integrated solutions in Enterprise Edition, IT specialists can create conceptual, logical, and physical views of their information systems. Users can intergrade Enterprise Edition diagrams into Microsoft Office documents and presentations, e-mail messages, and Web pages for clear communication across organisation. Enterprise Edition delivers a powerful, all-in-one IT design and documentation solution that is cost-effective for any organisation.

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Complete Storage Management

ARCserve**IT** 6.61 Windows NT

ARCserveIT protects your most critical business asset...data. This world-leader in backup/restore technology delivers record-breaking performance, easy administration and unsurpassed reliability. An extensive suite of options offer additional client/server support, enhanced performance and automation, online backup of business applications and fast disaster recovery.

ARCserveIT 6.61 Windows NT Workgroup Edition

Installs on a single Windows NT server. 250 Clients included.

(76730)

\$728

ARCserveIT 6.61 Windows NT Advanced Edition

To backup multiple Windows NT servers with centralised management. Unlimited clients included.

(77154)

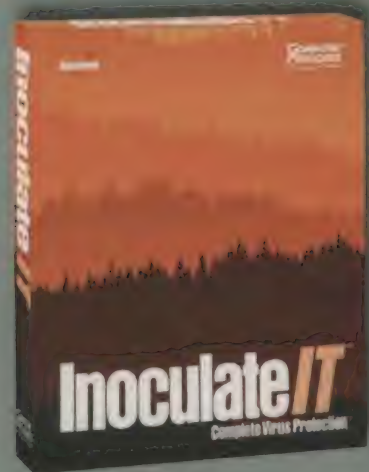
\$1,424

ARCserveIT 6.61 Windows NT Workgroup/Advanced Edition Disaster Recovery Option

(77681)

\$516

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Complete Virus Protection

Inoculate**IT** 4.53 Windows NT

InoculateIT is the premier antivirus solution for networked environments offering unmatched management and virus protection. Exclusive features of InoculateIT include Real-Time Cure, Universal Manager, Virus Wall, Virus Quarantine, Hands-Free Updates, Extensive Alerting Options, Internet Web Browser Integration and Messaging Protection. InoculateIT is certified by the International Computer Security Association (ICSA) to detect 100% of viruses "in the wild" and ensures your network is protected against potentially damaging and costly virus incidents. InoculateIT is fully integrated with AntiVirus clients for all major desktop systems.

InoculateIT 4.53 Windows NT Workgroup Edition

Installs on a Windows NT Server.

(76149)

\$509

InoculateIT 4.53 Windows NT Advanced Edition

Provides centralised management. Installs on each server.

(77969)

\$729

InoculateIT 4.53 Windows NT Workgroup/Advanced Edition

1 User Client	(76151)	\$59
10 User Clients	(76152)	\$413
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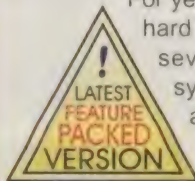
Easy hard drive partitioning



PowerQuest PartitionMagic 5.0

Create, resize, move and convert partitions without destroying data!

For years, power users have understood the secret of mastering hard drives-hard disk partitioning. Dividing a hard drive into several partitions lets you efficiently organize operating systems, programs, and data. With exciting new functionality and ease of use, the world's most trusted partitioning program, PartitionMagic 5.0 now puts the benefits of hard drive partitioning within reach of everyone.



- Graphical interface with full mouse support
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- Create, resize and move partitions on the fly
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Now
anyone can
partition their
hard drive
!!!

(86489)

\$115



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Includes hand-held Dragon NaturallySpeaking™ digital recorder which holds up to 40 min. (approx. 10 pages) of recorded speech. High-quality headset microphone. Dragon NaturallySpeaking Preferred, cable, linking software. (70978)

\$378

Dragon NaturallySpeaking 4.0 Standard

(82482)

\$196



Don't type, just use your voice! With Dragon NaturallySpeaking Standard,

the award-winning continuous speech recognition solution. Dictate into virtually any Windows application, including Microsoft Word 97 & 2000, Corel WordPerfect 8 & 9, and Lotus Notes. Even activate pull-down menus and issue voice commands like "Insert table" or "Print file" in Office 97 & 2000. Browse the Web and use hotlinks by voice, when using Microsoft Internet Explorer 4.0 & 5.0. Talk into chat rooms and Instant Messaging windows at up to 160 words per minute! Large vocabulary of 250,000 words and 160,000+ active words.



(82483)

\$89

Dragon NaturallySpeaking Essentials 4.0

The ideal, affordable introduction to continuous speech recognition for users age 9 and older. Special teen voice models are included so it's easy for young adults to talk into chat rooms and get their homework done easily.



(82484)

\$319

Dragon NaturallySpeaking Preferred 4.0

Dictation Play back. Use a Dragon Systems-certified recorder (sold separately) to capture your dictation for automatic transcription when you're away from your computer. Includes Naturally Mobile software.

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Total protection for your PC



McAfee Office 2000

McAfee Office 2000 combines everything you'll ever need to fix, protect, and optimize your PC into a single integrated utility. It contains the following great utilities:

1 VirusScan 4.02

Safeguards your PC from ALL viruses.

2 First Aid 2000 6.02

Fixes more Windows problems than any other software—automatically!

3 Nuts & Bolts 98 2.03

Clean, optimize, monitor, and analyze your PC and software.

4 Y2K Survival Kit 1.0

Contains all the tools you need to ensure that your PC successfully rolls over to the year 2000.

5 Oil Change 2.5

Updates your software... automatically!

6 UnInstaller 5.12

Keep your PC humming like new with UnInstaller.

(82448)

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McAfee VirusScan 4.0 Classic Edition

Stop viruses before they stop you with the Number 1 in Virus Detection and Removal!

The need to protect your PC has become vital as there are now over 40,000 known computer viruses with more than 300 new viruses being created each month.

Using only the latest technology, VirusScan detects 100% of viruses from floppy disks, Internet downloads, e-mail attachments, networks, shared files, CD-ROM and online services. It also scans inside the most popular compressed file types, and even protects against the newest threats to data security: Office 97/2000 macro viruses. The on-line virus encyclopedia and calendar deliver expert information on the latest viruses. And, with the Emergency Disk creation utility, you can easily recover from boot virus infection.



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(70216)

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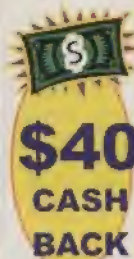


Virus Scan Deluxe

Includes
VirusScan
Classic, First
Aid 98, Oil
Change.

(70215)

\$77



**\$40
CASH
BACK**

December

Page

53

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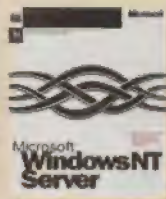
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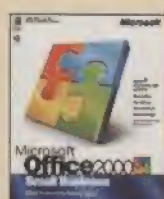
Windows NT Server



Windows NT Workstation



Office 2000 Standard



Office 2000 Small business



Office 2000 Professional



Office 2000 Premium



Office 2000 Developer

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Get Ready for Windows® 2000!



To help you get quickly up to speed on the latest technology, Microsoft Press offers several titles designed to train users on the new versions of Microsoft's popular Windows® operating system.

Microsoft Press Introducing
Windows® 2000
Professional



Explains how this robust client technology fits into overall Windows 2000 network operating system structure. It also compares Workstation functionality with that of the Windows 98® operating system. Readers get pre-released information about product reliability, scalability, security, and power.

\$49 (83236)

Microsoft Press Introducing
Windows® 2000 Server



INTRODUCING MICROSOFT WINDOWS 2000 SERVER is the book that IT professionals, managers, developers, system integrators, and consultants will want to read before and after the release of Windows 2000 to evaluate the product's principal enhancements at the server level.

\$49 (82669)

Microsoft Press Upgrade to
Windows® 2000 Training Kit



This kit teaches IT professionals how to set up, upgrade, and troubleshoot a Beta 3 installation of the Windows 2000 operating system. The curriculum focuses on understanding the changes from Windows NT® 4.0 and working effectively with the new system architecture, user interface, user profiles, and built-in networking components.

\$165 (84166)

Microsoft Press Windows®
2000 Beta Training Kit



Here's official Microsoft training material to help IT professionals install, configure, and support the pre-release edition of the Windows 2000 operating system. This modular, self-paced kit provides learners with the information and hands-on practice they need to exploit this technology's significantly enhanced reliability, security, networking, and performance capabilities.

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(74229)

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Inside Moves



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(83067)

Age of Empires 2:
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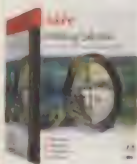
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Deliveries

Page
56

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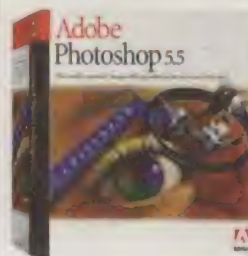
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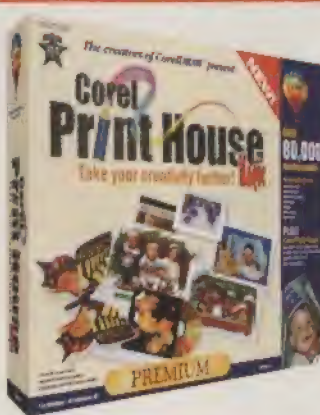
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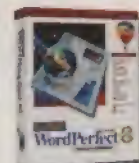
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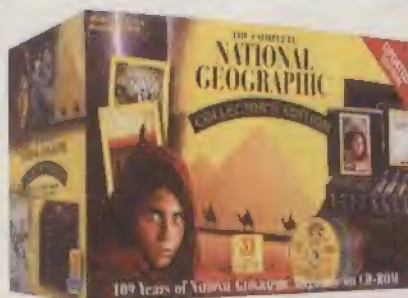
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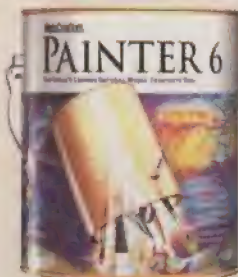
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Discover

Page 58

Painter 6 - New!



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(86111) **\$998**

Bryce 4



(75941)

\$457

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Poser 4



(79023)

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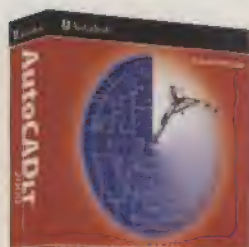
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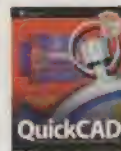
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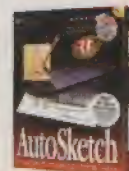
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(06701)

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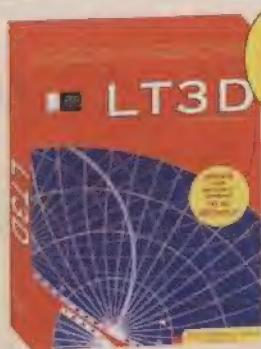


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Smart Architect LT

(86112) **\$914**

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LT 3D

(86113) **\$278**

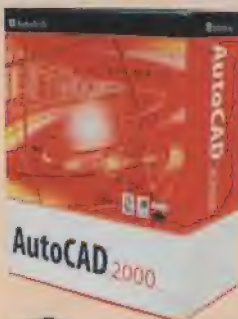
LT3D is a full 3D modelling plug-in for AutoCAD LT 97 or 98. LT3D provides AutoCAD LT with a range of tools to cater for all types of 3D modelling as well as the power to modify and measure. It includes routines for creating 3D surfaces and solids, and tools for modifying and editing them. In addition there are some routines to make viewing and manipulating your 3D scene much easier.

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(84604)

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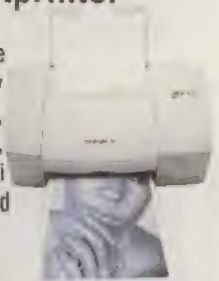
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The Performance Printer

Utilising an advanced new colour cartridge, the Z51 is capable of exceptional photo quality printing straight out of the box. USB interface, which improves connectivity with your PC, Accu-Feed™ paper handling, 1200 x 1200 dpi and a print speed of up to 10ppm, are all standard features of the Z51.

(84605)

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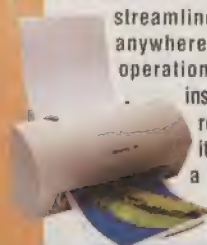
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(86475)

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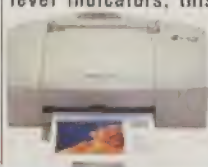
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Great Results Made Easy

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(74464)

\$257



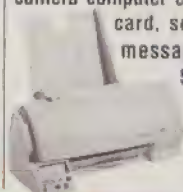
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(86469)

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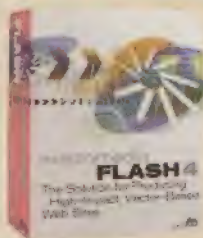
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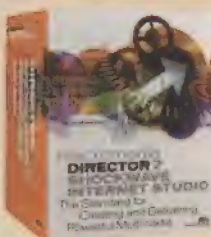


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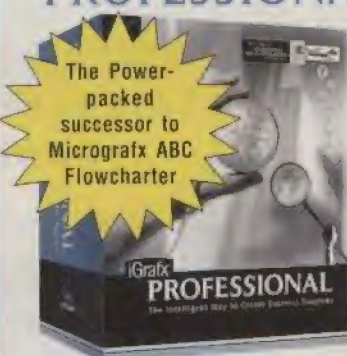
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(86474)

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(81562)

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(76450)

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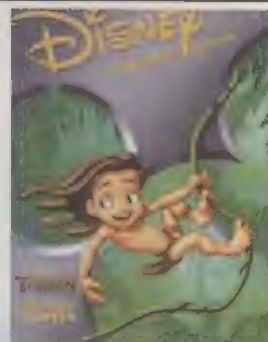
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(76451)

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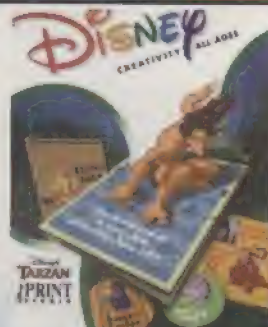
(81563)

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(76449)

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Page
62

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Carmen Sandiego Series



Where in the World is Carmen Sandiego?

A crime-stopping voyage through history! Your search for Carmen begins in Ancient Egypt and ends with the first space launch. Along the way you'll learn about events, achievements and personalities including Columbus, da Vinci and Queen Elizabeth. To dig even deeper, consult the Chronopedia, an electronic reference book approved by Encyclopedia Britannica.

(85907)

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Carmen Sandiego's Great Chase Through Time

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(84570)

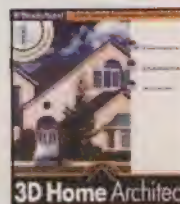
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(85966)

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ACN 076 093 644

December 1999

**\$50
Cashback**

MS Office 2000
Professional Upgrade
see p23



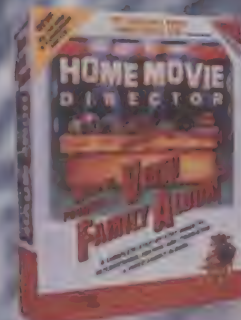
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Professional
see p37



**Only
\$19**

see p2

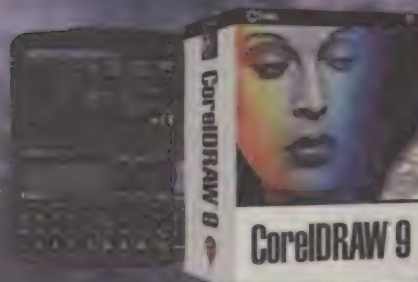


**ADAPTEC
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4 Deluxe**

see p7



Corel Draw 9
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see p26



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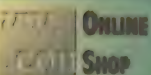
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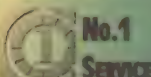
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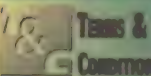


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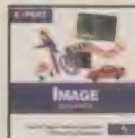
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BOD010
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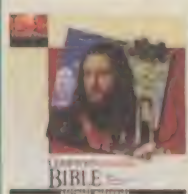
Toolbox 2000



Checks your PC for Year 2000 compatibility (less than one month away!) and tells you how to fix the problems. Checks the Time Clock, BIOS and hardware compatibility, as well as scanning your Windows settings and data files.

Limited Stocks
MAC053
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Comptons Multimedia Bible



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COM013
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Uninstaller



Cleans out your PC and gets rid of junk files - automatically! Your PC is probably crammed with unwanted software and junk files that can slow down your PC and cause problems! If you try to remove these files without Uninstaller, you may overlook some, or worse, delete required or critical files. Uninstaller cleans the junk but protects your crucial files - it's the safest way to clean up your PC.

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See page 17

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Now you can produce a Video Family Album quickly & easily using just your camcorder & VCR. Contains easy to follow handbooks & set up guides, script editor, video label printer plus a bonus instructional video & CD-ROM. This motion picture album is a must for all camcorder owners.



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COR542
\$79

WebSearch Code: ABC003

WebSearch Code: NIT020

WebSearch Code: COR542



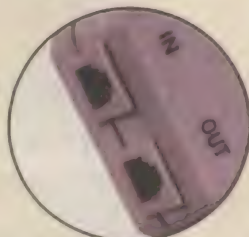
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2 modular sockets for protecting your telephone, modem, answering machine, fax machine etc...

JACK01

\$59

WebSearch Code: JACK01

Microsoft Intellimouse Explorer



The Intellimouse Explorer replaces the rubber ball mechanics of a traditional mouse with an optic sensor that scans your desktop 1500 times a second for pin point accuracy.

WebSearch Code: MSS576

MSS576

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Microsoft Internet Keyboard



The Internet Keyboard gives you a high-quality design with tools and easy Web access to help you work more efficiently. Get online with push of a button, and check mail with another.

WebSearch Code: MSS264

MSS264

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MPlayer3

MP3 is the new recording format taking the world by storm. Music is digitally stored, and the MP3 device reads the music data directly, without any mechanical motion taking place. The quality of reproduction is CD standard, and because there are no mechanical parts, the unit is extremely shock proof.

With the MPlayer3, music files are stored on exchangeable flash cards - MultiMediaCards. This enables you to increase available storage, and change the music simply by changing the card. You don't have to keep downloading each time you want to change the music. The cards are currently available in 16MB (approximately 20 min of music) and 32MB (approximately 40 min of music), and can be purchased separately. German made. Full version operating software (Win/Mac/Linux) included.



MPlayer3 Win/Mac + 32MB MPL001

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WebSearch Code: MPL001

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Princo's CD Re-Writer Disc is fully compatible with any CD-RW writer.

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WebSearch Code: PRI010

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WebSearch Code: KOD042

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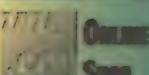
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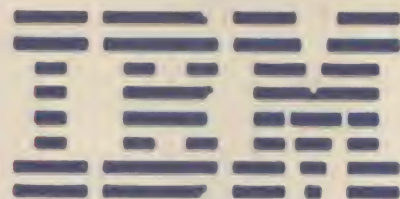
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- Thin Film Transistor Liquid Crystal Display panel with 15.1"/38.4cm viewable diagonal screen size providing excellent image quality
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WebSearch Code: MIT015

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MIT015
\$2149

Daewoo 15" Monitor



- 5188 FST Colour digital monitor
- 1280 x 1024 resolution (at 60Hz)
- 0.28mm dot pitch
- non glare anti static screen
- 20 mode memory
- 3 year warranty

* Actual Products may vary from illustrations shown

WebSearch Code: DAE003

DAE003
\$299

Daewoo 17" Monitor



- 1710B FST Colour digital monitor
- 1280 x 1024 resolution (at 60Hz)
- 0.28mm dot pitch,
- non glare anti static screen
- 20 mode memory
- 3 year warranty

* Actual Products may vary from illustrations shown

WebSearch Code: DAE004

DAE004
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Drive	Model	Speed	AccessTime	Price	Code/WebSearch
Fireball CX 6.4 GB	QM306400CX-A	5400rpm	9.5ms	\$199	QUA170
Fireball CR 8.4GB	QM308400CR-A	5400rpm	9.5ms	\$235	QUA176
Fireball CX 13.0GB	QM313000CX-A	5400rpm	9.5ms	\$339	QUA177
Atlas IV 9.1 GB Ultra	QM309100KN-LW	7200rpm	6.9ms	\$579	QUA189
Atlas IV 9.1 GB Ultra	QM309100KN-SCA	7200rpm	6.9ms	\$579	QUA190
Atlas 10K 9.1 GB Ultra	QM318200KN-LW	7200rpm	5.0ms	\$815	QUA192
Atlas IV 18.2 GB Ultra	QM309100KN-LW	7200rpm	6.9ms	\$999	QUA191

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Compro Flat Panel Speakers with NXT technology. Super slim and light loudspeakers with awesome audio performance. The NXT advent is in keeping with the explosive advances in information technology. NXT is pre-eminent in applications wheresynchronicity between image and sound is important. synchronicity between image and sound is important.

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- NXT Flat panel technology
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CMP020**

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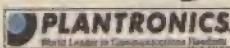
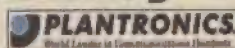
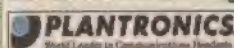
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CMP014**

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WebSearch Code: CMP020

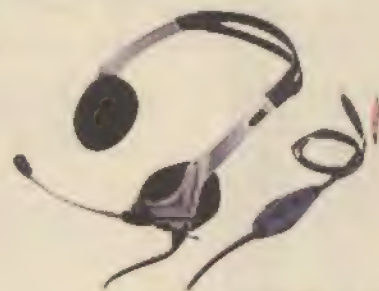
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Light Weight Stereo Headset (LS1)

PLA049

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WebSearch Code: PLA049

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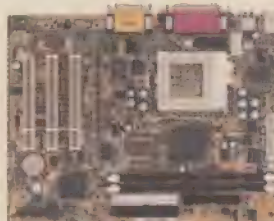
MSI001

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WebSearch Code: MSI001

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- Y2K/PC99 Compliant



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MSI002

\$239

WebSearch Code: MSI002

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- ATA 33/66 Ready
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- Y2K/PC99 Compliant



MSI

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\$249

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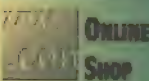
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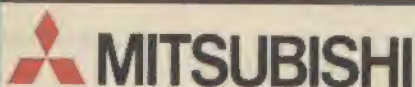
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50X CD-ROM

50 Speed CD-ROM Drive Hits the Market

This new product, in particular, is designed to optimise vibration and noise from high speed playing to ensure high performance and stability.

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- Weight – 900 grams
- Warranty – 12 months
- Quiet operation
- Low disc vibration
- Multi-read compatible (CD-RW)
- CD Play button for software-free CD playback



WebSearch Code: MIT014

MIT014
\$99

Pioneer 6X DVD & 32X CD-ROM Drive

Includes Cyberlink Power DVD Software Decoder



Pioneer again lead the way with the release of their new 6X DVD-ROM drive series. Offering blistering 6X DVD and 32X CD-ROM read performance combined with Pioneer's ultra-stable tray-load technology, the DVD103/113 series are simply the best available. From Pioneer, the leader in DVD.

Features

- High speed 6X DVD class, sustained data transfer rate of 8.1 Mbytes/sec!
- Reads Single and Dual Layer DVD-ROM, DVD-Video discs plus DVD-R, CD-ROM, CD-R and audio CDs
- Uses Pioneer's ultra-stable tray-loading disc technology
- Ultimate quality hardware from Pioneer, the leaders in DVD
- 2 Year Warranty
- Internal



WebSearch Code: PIO009

PIO009
\$199

DVD Pro-Kit with Microsoft Encarta DVD 99!

**FREE
ENCARTA**

The Pro-Kit DVD upgrade kit offers the complete multizone DVD playback solution for all Pentium PCI or faster PC's. Combining the best available DVD-ROM drive with the market leading DVD decoder card, the Pro-Kit DVD offers nothing but the best in hardware quality. Add to the kit Microsoft's Encarta 99 DVD Reference Suite and you have all you need to get started!

Features

- Super-fast 6X Pioneer slot-load DVD-ROM drive (32X CD-ROM)
- Play the latest DVD movies full screen on your PC at full frame rates in full colour, with hardware decoded Dolby AC3 audio!
- Multizone playback up to a maximum of 5 times
- Composite and S-video outputs built-in for display straight to a television
- Capable of reading all CD and DVD formats (not DVD-RAM)
- Bundled with Microsoft's Encarta 99 DVD Reference Suite: Includes MS Encarta Deluxe 99, Microsoft Virtual Globe 99 and Microsoft Bookshelf 99 all on 1 DVD-ROM!



WebSearch Code: PIO007

Internal
PIO007
\$475

Prelude! 1-2-1 CD Duplicator



You'll soon discover just how easy it is to make your own CDs with the touch of a button!

Verbatim Prelude! 121 Duplicating System is the perfect way to duplicate and distribute CD's from home or the office. Place an original CD in the 32x CD reader drive, followed by a recordable CD in the 4x CD recorder drive after the system has read the contents. Press the button and presto! You've got a true copy without having to turn on your computer in less than 20 minutes! (Note: The smaller the CD you are copying, the faster the Prelude! 121 works).



WebSearch Code: VER087

VER087
\$2399

Verbatim Datalife Plus CD-R and CD-RW discs

Verbatim CD-R and CD-RW discs encompass the latest technology for superior performance. They feature a proprietary Metal AZO dye (which offers the best protection against sunlight), multi-speed recording, scratch-resistant, protective coating, a fully printable surface and across the board writer compatibility.



WebSearch Code: VER043
WebSearch Code: VER080
WebSearch Code: VER081

Single CD-R
VER043
\$3

Single CD-RW
VER081
\$12.95

10 Pack CD-R Media
VER080
\$25



HP CD-ReWriter Plus 9100i

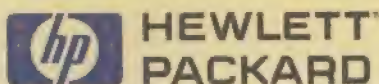
Incredible - 38x 8x 4x!

Now the fastest, easiest, most reliable way to make your own CD's is 38 x 8 x 4. This is the top of the line, multimedia, multipurpose Internal IDE CD-RW (ReWritable) drive which supports Multi-Copy, to ensure all copies are identical to the original. The 9100i also supports 80 minute CD overburn.

- Easy installation, plugs straight into your IDE port, easily transferred between computers.
- Adaptec Direct CD & Easy CD Creator makes it easy to write data, photo, audio and video files to a CD.
- HP Disaster Recovery quickly and easily restores your hard drive files and operating system in minutes.
- HP Fast Format writes or formats CD-RW's in less than 5 minutes.

ISWH Christmas Bonus Pack

- 10 x HP CD-R discs
- 1 x HP CD-RW disc
- HP CD Wallet
- HP Fast format
- HP Disaster Recovery
- CD-Labeler
- Corel Print Office
- eFax Filing Central
- Adaptec Easy CD Creator
- Adaptec DirectCD



Expanding Possibilities



HPP048

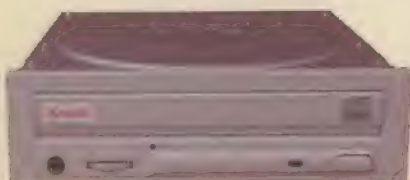
\$639

STORAGE & CD WRITERS

Kodak IDE CD-ReWriter Kit

Features

- 4x Writable, 4x ReWritable, 24x Read
- Disc and track-at-once recording
- New WinOnCD 3.6
- Packet CD 3.0
- Gazo Personal Imaging Warehouse
- Video CD2.0 capable
- Full in-box solution
- Audio Features
 - includes 5m long HiFi connection cable
 - record to hard drive from any audio source
 - de-click, EQ adjust, insert track breaks, etc
 - MP3 to CD Digital Audio



KOD049

\$449

WebSearch Code: KOD049

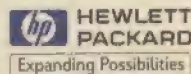
CD-ReWriter Plus 7510e

Easy Installation 6x 2x 2x

- Includes all cables & accessories
- External / Portable CD-RW drive
- Connect to your PC or Laptop

ISWH Christmas Bonus Pack:

- 5 x HP CD-R Disc's
- 1 x HP CD-RW Disc
- HP Fast Format
- HP Simple Trax
- HP Disaster Recovery
- ACID Music Creator
- Adaptec DirectCD
- Adaptec EasyCD Creator



HPP045

\$555

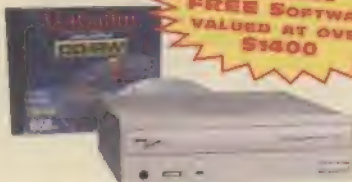
WebSearch Code: HPP045

Verbatim Smart and Friendly CD SpeedWriter Plus 4224 Internal IDE

The Smart and Friendly CD SpeedWriter Plus is a 4x Write, 2x ReWrite, 24x Playback CD-Recorder with a plentiful 2MB buffer, capable of creating a full 650MB CD in as little as 17 minutes. It is ideal for music and audio storage, data archiving and backup, disaster recovery, digital imaging and a whole range of multimedia applications.

Software Suite includes:

- Adaptec Easy CD Creator Standard
- PowerQuest Drive Image
- Diamond Cut Enhance/CDR
- Sonic Foundry CD Architect
- Sonic Foundry Sound Forge XP
- MediaPath MediaAgent
- ECI Disc Inspector Pro
- Smart & Friendly CD Consultant



INCLUDES
FREE SOFTWARE
VALUED AT OVER
\$1400

IDE (Internal)
VER079

\$419

SCSI (External)
VER082

\$799

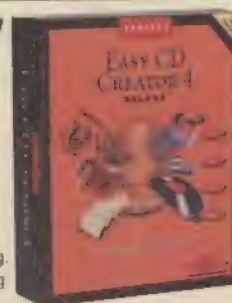
WebSearch Code: VER079
WebSearch Code: VER082

Easy CD Creator 4 Deluxe

Easy CD Creator 4 Deluxe goes way beyond the software that came with your CD-Recorder - It's the easiest way to put your world on CD! Now it's easier than ever to create audio and backup CDs, access music on the internet, fine tune your music tracks, enhance photos and videos like a pro, and create your own CD labels. Easy CD Creator 4 Deluxe is the premium, all-in-one solution for CD-recording. And when it comes to saving precious memories or backing up important data, there's nothing better than a virtually indestructible CD!

New Features:

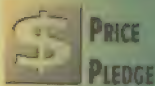
- Take Two lets you quickly, economically and safely store vital business information on CD. Supports both CD-R and CD-RW
- MP3 Music Support to access, purchase and download music from popular music web sites. Includes free authorized MP3 songs
- CD Guide is the easy-to-use interface that walks you through the recording process
- Web Checkup enables you to download the latest Adaptec software program files
- MG1 VideoWave II SE for adding special effects, correct color and more
- Jewel Case Creator - includes new professionally designed themes
- CD labeler and blank labels ink jet and laser printers included



ADA074

\$119

WebSearch Code: ADA074



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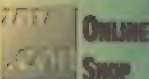
- Same day, Sydney*
- Next day*
- International*

* where available



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Saturday



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change, see page 46 for
terms and conditions.



EXPRESS ORDERLINE 1300 300 003

iomega zipCD Internal E-IDE CD-RW Drive

The lean, mean cloning machine - 4x Record, 4x Write, and 24 Max Read!

The iomega ZipCD drive is easy to use - just point and click. Use it to back up and archive important files, or share multimedia presentations, photos, and Internet downloads. Plus, your ZipCD drive allows you to record and erase your original music on CDs and play them in your home or car stereo. With bundled software to enhance performance, the ZipCD drive is a complete solution.

Bundled Software

Whether you want to start or enhance your digital photo library or protect your daily work files on dependable ZipCD media, the software suite included with the ZipCD drive will meet your needs.

- Adobe Photoshop Limited Edition: Touch up, enhance, and energize your images.
- Adaptec Easy CD Creator: Create your own CDs.
- Adaptec DirectCD: Drag and drop files to CD.
- iomega Quik Sync: Keep your important files safe automatically.
- Avery Media Software: Special edition software for formatting and printing CD labels.



Note: Please confirm system requirements before purchasing

WebSearch Code: IOM121

IOM121

\$399

**We sell blank CD-R
Discs for only \$2.70 each**



KODAK 74 MIN CD-R

KOD042	Kodak CD-R 74 min 8x KSP	\$2.70
KOD043	Kodak CD-R 74 min 8x NSP	\$2.70

Also Available:

PRI010	Princo CD-RW Media	\$5.99
PRI006	Princo CD-R 80Min	\$5.95
HPP024	HP CD-R 650MB Single	\$3.90
HWP252	HP CD-RW Single	\$29.00
SONY18	Sony CD-R 650MB 74Min 10-PK	\$36.99
SONY33	Sony 3.5 DSHD Disk 10-PK	\$8.50

IOM030	Zip 100MB Disks PC 10-PK	\$185
IOM086	Zip 100MB Disk Mac 1-PK	\$25
IOM074	Zip 100MB Disks Mac 10-PK	\$189
IOM085	Zip 100MB Disk PC 1-PK	\$25
IOM099	Zip 100MB Gigacolor Disks 2-PK	\$39
IOM102	Zip 250MB Disks PC 10-PK	\$319
IOM103	Zip 250MB Disk PC 1-PK	\$35
IOM112	Zip Drive 6 Disk Wallet	\$29

Compro CDRW 4420-NB

**ULTRASLIM
DESIGN
PERFECT FOR
NOTEBOOK
USERS**

The Compro CDRW 4420-NB is one of the world's first CD re-writers with CD recording, rewriting and reading function all in a slim 23mm height housing. Notebook users can now enjoy the convenience of CD writing and rewriting all on one single drive. Available for both USB and PCMCIA ports.

Users will enjoy the unsurpassed performance of 4x CD writing and rewriting as well as 20x CD reading.



Bundled with

- Easy CD Creator
- Direct CD software
- Compro 16 CD holder
- Sample CD-Recordable Media
- Sample CD-Re-Writable Media

PCMCIA
CMP016

\$959

USB
CMP015

\$959

WebSearch Code: CMP015
WebSearch Code: CMP016

LaBelle CD Labeller

Give your CDs the professional touch. This clever yet simple labeller lets you put neat and professional looking labels on to your CDs. Labels are available for both inkjet and laser printers.

Labelling a floppy disk is one thing, however, labeling a CD-ROM is quite another. Since the label on a CD must be placed exactly in the middle and may not overlap anywhere, you can either squint your eyes and hope for the best, or you can entrust the exact positioning to LaBelle.

Modern CD-ROM drives with increasingly higher rotation speeds demand smaller and smaller tolerances.

Through precise label centering, the Swiss made LaBelle insures that the CD spins evenly and thus data readability is not corrupted.

- CD label applicator
- CD Software (PC/Mac)
- CD Labels (1440 dpi optimised)
- Inlay Cards

...simply the best labeling system on the market.

For a full range of labels visit our website at www.iswh.com.au

WebSearch Code: LAB006
WebSearch Code: LAB008
WebSearch Code: LAB012



LaBelle Starter Kit
LAB006

\$45

JetGloss 20 Label Pack
LAB008

\$25

JetColour Pro 20 Label Pack
LAB012

\$22

LAB013	LaBelle Jetgloss CD Labels 50 Pack	\$55
LAB014	LaBelle JetLaser CD Labels 100 Pack	\$69
IOM097	Jaz 2GB Disk PC 1-PK	\$199
IOM006	Jaz 2GB Disk Mac 1-PK	\$199
IOM089	Jaz 2GB Disks PC 3-PK	\$559
IOM078	Jaz 2GB Disks Mac 3-PK	\$579
IOM106	Clik! Disks 2 Pack	\$65
IOM107	Clik! Disks 10 Pack	\$175



iomega Zip250 USB

The Latest Super Floppy solution from iomega

The latest addition to the Zip product line, the Zip 250 USB drive, offers an ultra-thin mobile design that meets the high-capacity storage needs for both PC and Mac users. At 2.5cm thick and weighing just over 400g, the Zip 250 USB drive can accompany the most demanding mobile computer user. Connect the drive conveniently via the USB port, or for ultimate versatility, the Zip 250 USB/PC card drive version can be connected via USB port or the PCMCIA slot of your mobile computer.

- Compatible with USB-enabled PC and Macintosh systems.
- Requires MacOS 8.1 or higher, or Windows 95, Windows 98, or Windows NT 4.0.
- Zip 250 USB/PC card drive can connect via PCMCIA interface with Windows 95 or Windows 98.
- PCMCIA connection is host powered and does not require an external power supply.
- Hot plug and play, except Windows NT 4.0.
- Up to 900KB/sec transfer rate.
- Includes iomegaWare 2.1 with the latest software advancements from iomega including QuikSync instant backup utility.
- Compatible with both 100MB and 250MB Zip disks.
- Compatible with more than 150 million 100MB Zip disks shipped to date.

**Now
COMES WITH 2
250MB ZIP DISK
TO HELP YOU GET
STARTED***



*while stocks last. Offer valid for IOM109 and IOM108 only.

WebSearch Code: IOM108
WebSearch Code: IOM109

Also available at a new low price
IOM100 Zip 250 Parallel.....\$289
IOM101 Zip 250 SCSI\$289

Zip 250 USB/PC Card
IOM109

\$399

Zip 250 USB
IOM108

\$345

STORAGE AND MEDIA

iomega Zip Starter Kits

Parallel port 100MB Zip drive

- back up your hard drive
- take your stuff with you
- use it like a hard drive

4 genuine multicoloured 100MB Zip disks

- each disk holds up to 70 floppies
- great for multimedia
- colours help organise

WebSearch Code: IOM096

IOM096

\$249

iomega 100MB Zip USB

The perfect companion for iMac & PCs with windows 98

- Easy to connect - just plug it into your USB port, and you're ready to go
- Hot swappable - switch with other USB devices without turning off your computer
- Compatible with 100MB* Zip disks - over 100 million disks sold
- Reliable - use it like your hard drive - save your files and run your software
- Fast, unlimited capacity - add 100MB* at a time

WebSearch Code: IOM098

IOM098

\$245

You could WIN a Hayman Island holiday

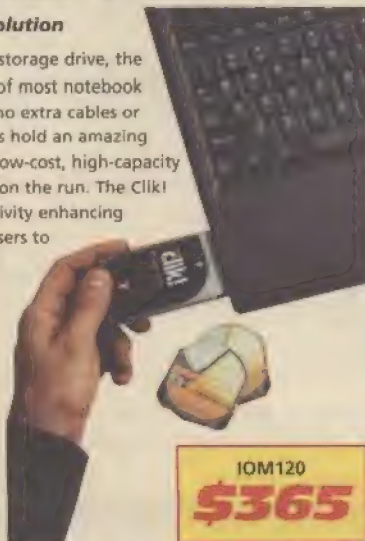
With any purchase of an iomega drive between 1 November and 31 December 1999, you will receive a FREE beach chamois and are entered into the draw to WIN a trip for two to Hayman Island for 7 days.

Prizes may vary. See website for details. Call for information.

iomega Klik! PC Card Drive

The compact, go-anywhere storage solution

A lightweight and highly mobile removable storage drive, the Klik! PC Card Drive fits into the PC card slot of most notebook computers. It comes ready to run and with no extra cables or batteries, is easy to install and use. Klik! disks hold an amazing 40MB of information and provide the ideal low-cost, high-capacity removable storage solution for storing data on the run. The Klik! PC Card drive also includes iomega's productivity enhancing QuikSync and Copy Machine which enable users to develop a complete and reliable backup and storage solution.



WebSearch Code: IOM120

IOM120

\$365

jaz 2GB Who said size doesn't matter?

When it comes to multimedia, the super fast, extremely vast personal storage drive from iomega thinks it does. Jaz drives and disks offer the ideal solution for storing, transporting and playing multimedia applications. You can pack up to 2 gigabytes on each disk, and there is no limit to the number of disks you can use. Speedy access times and rapid transfer rate mean you can quickly and easily move files around. The Jaz drive can handle even the most demanding usages, including full-screen full motion videos!



WebSearch Code: IOM083
WebSearch Code: IOM082

iomega Jaz 2GB (Ext)
IOM083

\$645

iomega Jaz 2GB (Int)
IOM082

\$679



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- International*

* where applicable



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EXPRESS ORDERLINE 1300 300 003

KYOCERA FS-680

All lasers are not created equally!

Kyocera has re-defined laser printer design to avoid the frequent replacement of the drum and the developer. When a Kyocera ECOSYS printer runs out of toner, that's all you replace. It not only costs less, it causes less harm to the environment too.



Print speed	8ppm
Resolution	600dpi enhanced to 2400dpi
Standard emulations	HP PCL 5e
Processor	50 MHz Power PC
Standard / maximum memory	4 / 36Mb
Standard paper input	150-sheet cassette
Maximum paper input	400 sheets, 2 sources
Consumer yield	3,000 A4 pages @ 5% coverage
Duty cycle	5,000 pages / month

KYO016

\$585

WebSearch Code: KYO016

Lexmark Z31 Color Jetprinter



The Lexmark Z31 is part of the new Lexmark Z Series Color Jetprinters, a range of versatile high performance printers perfectly suited for anyone demanding the highest quality possible from a colour inkjet printer.



Features:

- Unique laser-crafted printheads offer 1200 x 1200dpi on all media types
- Accu-Feed - provides perfect paper alignment, virtually eliminating frustrating paper jams.
- Lightning fast print speeds - up to 8ppm black, up to 3.5ppm colour
- Optional Photo Cartridge
- LexExpress Warranty - Lexmark customers receive access to a free Technical Support Hotline and Internet site during the 1 year warranty period.

LEX119

\$325

WebSearch Code: LEX119

GET THE RIGHT INK CARTRIDGES FOR YOUR PRINTER

If this is your printer:	Then this is your ink cartridge:	This is our code:	This is your price:
Kyocera FS-680	Toner - TK16	KYO020	\$85
Lexmark Z31	Black - 12A1970	LEX105	\$65
	Colour - 12A1980	LEX104	\$75
Canon BJC-6000	Black - BC30	CAN103	\$69
	Colour - BC31	CAN104	\$79
	Photo - BC32	CAN110	\$85
Canon BJC-80	Black - BC10	CAN054	\$59
	Colour - BC11E	CAN053	\$75
Canon LBP800	Toner - EP22CART	CAN112	\$99
Canon BJC-2000SP	Black - BC20	CAN024	\$55
	Colour - BC21E	CAN015	\$79
Canon BJC-265SP	Black - BC02	CAN063	\$49
	Colour - BC03	CAN236	\$45
	Photo - BC06	CAN007	\$55
	Fluoro - BC09F	CAN111	\$75

IF YOU DON'T SEE WHAT YOU NEED ABOVE, CONTACT OUR SALES TEAM ON 1300 300 003 FOR A FULL RANGE OF INK CARTRIDGES FOR ALL MAJOR PRINTER BRANDS

**Don't forget to check
if you need a cable
for your printer**

CAB016	1.8M Bi-Directional Parallel Printer Cable	\$14.95
CAB035	1.8M USB Printer Cable	\$14.95

LEX110	Lexmark 1100 Color Jetprinter	\$149
LEX575	Lexmark 3200 Color Jetprinter.....	\$269
LEX111	Lexmark Optra E310	\$839
KYO017	Kyocera FS-1700 Laser.....	\$1639
CAN218	Canon BJC-4650 (A3).....	\$409
CAN100	Canon BJC-7100	\$499
CAN225	Canon BJC-5500	\$1245
CAN081	Canon BJC80 Scanner Head	\$135



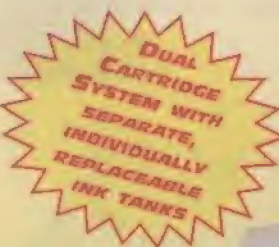
Canon BJC-6000

Excellent all-purpose printer

The new Canon BJC-6000 delivers optimum balance between speed and cost performance and true photo-quality results.

Features:

- Print speeds up to 8ppm in black text and 5ppm in colour (bi-directional).
- High Resolution output up to 1440dpi (BC-32).
- Revolutionary see through ink tanks (BC-31). An optical ink level sensor warns the user when inks are low.
- New Pigment black ink for faster, sharper, smoother black text.
- Using the optional USB interface cable, the user can easily connect to USB compatible Windows 98, iMac and Mac G3 computers.
- Paper Size - A4, A4+, B5, A5, Letter, Letter+, Legal, Envelopes (DL size or Commercial 10) Canon 4"x6" Glossy Photo Cards.
- Media Type - Plain Paper, Envelopes, Transparency Film, Bubble Jet Paper, Brilliant White Paper, High Resolution Paper, Glossy Photo Paper, High Gloss Photo Film, Back Print Film, Fabric Sheet, T-Shirt Transfer Paper, Glossy Photo Cards, Banner Paper.
- Compatible with Microsoft Windows, 3.1x/Windows 95/Windows 98/Microsoft Windows NT 4.0.



CAN249
\$475

WebSearch Code: CAN249

PRINTERS & CONSUMABLES

Canon BJC-80

Uses half your briefcase not half your desktop!

- Drop Modulation Technology™ - the dual drop size breakthrough that produces smoother colour gradations.
- Office laser quality finish and B&W speeds up to 4.5 pages per minute with dedicated black cartridge.
- Better Internet images with Image Optimiser.
- Windows 95 compatible IrDA infrared port for cable-less communications.
- Optional scanner head for colour graphics, OCR and faxing.
- Fits in half a briefcase, weighs only 1.4kg!
- International warranty included with purchase.



PERFECT
FOR
NOTEBOOK
USERS

CAN001

\$335

WebSearch Code: CAN001

Canon LBP800

Big laser performance on a personal laser budget

The new affordable laser beam printer from Canon features a compact desktop design plus:

- Convenient face up or face down paper delivery, with overlay function.
- Resolutions of 300 x 300dpi, 600 x 600dpi, and 2,400dpi with text and line smoothing.
- High speed - up to 8ppm!
- 125 page Multipurpose Tray and single sheet Manual Feed Slot.
- Comprehensive job control via Canon including Match Paper Size, Multipage per Sheet, Collate, Form Overlay, Custom Paper Size, Toner Saver and Automatic Image Refinement modes.
- Win 95, 98 and NT 4.0 drivers available.



New high end version also available
Canon LBP 1760
CAN259

\$1729

CAN258

\$589

WebSearch Code: CAN258
WebSearch Code: CAN259

Canon BJC 2000SP

Super Economy, Super Performance

- Compact new desktop design for printing ease.
- IEEE 1284 P/Port.
- High-quality photos and text with super economy.
- 720 x 360dpi resolution produces exceptional image quality in regular colour mode.
- Advanced image processing with Photo Optimiser mode automatically corrects image colour, exposure and saturation for the printer, without affecting the original image file.
- Auto image enhancement for low-resolution graphics dramatically improves print quality, especially at larger print sizes.
- Instant conversion into a full-colour, sheetfed scanner by simply popping in the optional Scanner Cartridge IS-22.
- Accepts a full range of media for every application.



Optional Scanner Attachment
CAN099

\$139

CAN252

\$169

WebSearch Code: CAN252

Canon BJC 2655P

Advanced driver features & photo quality, at a budget price

- Super economy super performance Bubble jet printer.
- Budget priced with advanced driver features and photo-quality.
- Image optimiser setting reduces jagged edges & faded colours.
- Using the appropriate black or colour cartridge, produce up to 2400 pages in black & white & 400 pages in colour.
- Using optional BC-06 PhotoRealism colour cartridge photo quality images are easily achieved.
- Use appropriate software to print banners for all occasions.
- Print at up to 4 pages per minute for black text.



CAN257

\$129

WebSearch Code: CAN257



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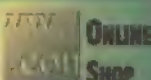
- Same day, Sydney*
- Next day*
- International*

* where available



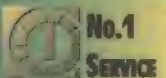
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Saturday



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EXPRESS ORDERLINE 1300 300 003

HP DeskJet 810C

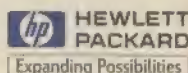
HP's brilliant photo-quality colour printer at the right price

The HP DeskJet 810C makes everything you print look great, even on plain paper. With HP's Reallife Imaging System, brilliant photo-quality colour printing is easy. Built-in ColorSmart II gives you perfect colour automatically, so what you see on screen is what you get.



Features:

- prints up to 6.5 pages per minute black, 3 pages per minute colour
- resolution 600dpi black, HP PhotoREt II colour
- easy setup and operation provide hassle-free printing
- compact design and quiet operation ideal for small workspaces
- compatible with Windows NT 4.0, 98, 95, 3.1x and MS DOS applications
- Parallel and USB connectivity



Expanding Possibilities

HWP378

\$345

WebSearch Code: HWP378

HP DeskJet 970Cxi

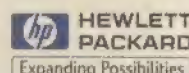
The premier photo-quality printer for busy business professionals who take their image very seriously

The HP DeskJet 970Cxi delivers stunning print quality, speed and reliability in one amazing printer. More than a small step up, 970Cxi represents a significant leap forward in inkjet imaging technology, performance and ease-of-use.



Features:

- Stunning photo-quality images with PhotoREt 3 HP Colour Layering Technology
- 2400 x 1200dpi mode included*
- Print speed up to 12ppm black, 10ppm colour
- Network-capable with optional JetDirect print server
- Automatic two-sided printing and print cancel button save time and paper
- Helpful low-ink indicator ensure you never run out of ink while printing
- IEEE 1284 - Centronics parallel compatible; USB (Win 98 and USB-Connect Mac)



Expanding Possibilities

HWP413

\$775

* using photo paper

WebSearch Code: HWP413

GET THE RIGHT INK CARTRIDGES FOR YOUR PRINTER

If this is your printer:	Then this is your ink cartridge:	This is our code:	This is your price:
HP DeskJet 810C	Black - C6615A Economy Tri-colour - C1823G	HPI027 HPI023	\$55 \$49
HP DeskJet 970Cxi	Large Black - 51645A Tri-colour - C6578DA	AUC122 HPI026	\$59 \$69
EPSON Stylus Color 760	Black - S020189 Colour - S020191	EPS333 EPS335	\$45 \$45
EPSON Stylus Photo 1200	Black - S020187 Colour - T001011	EPS334 EPS374*	\$39 \$65
EPSON Stylus Color 900	Black - T003011 Colour - T005011	EPS352 EPS353	\$55 \$65
EPSON Stylus Photo 700	Black - S020093 Colour - S020110	EPS069 EPS145	\$39 \$45
EPSON Stylus Color 460	Black - S020187 Colour - S020191	EPS334 EPS335	\$39 \$45

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**Don't forget to
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cable for your
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CAB016	1.8M Bi-Directional Parallel Printer Cable	\$14.95
CAB035	1.8M USB Printer Cable	\$14.95

HWP405	HP DeskJet 610C	\$249
HWP355	HP DeskJet 880C.....	\$479
HWP345	HP DeskJet 895Cxi	\$629
HPP019	HP DeskJet 1120C.....	\$785
HWP257	HP LaserJet 1100	\$789
HWP258	HP LaserJet 1100A	\$925
HWP209	HP OfficeJet 635.....	\$665
HWP382	HP OfficeJet 725	\$795



EPSON Stylus Color 760

Superb performance for the advanced home and small business user.

The new EPSON Stylus Color 760 incorporates the latest state-of-the-art technology to ensure it is right at home meeting the demands of the advanced home and office user. By combining EPSON's Advanced Variable-Sized Droplet technology and Ultra Micro Dots with EPSON's award winning PerfectPicture Imaging System, the EPSON Stylus Color 760 has created a new standard of image quality for the SOHO environment. It's the ideal solution for printing business presentations, desktop publishing projects and digital photographs.

Features:

- Produces true 1440 x 720 dpi printouts - even on plain paper, which means you can include eye-catching colour charts and graphics in all printed material.
- Increased printable area - you can now set the margin to 3mm on all four sides of an A4 document - perfect when printing enlargements of your favourite photo.
- Improved new user interface - includes a full function on-screen Status Monitor which makes it easy to check ink levels and paper availability at a glance.
- PhotoEnhance 4 function - analyses your print job and makes brightness, contrast and colour adjustments automatically WITHOUT affecting the original file. Basic improvements over previous versions include:
 1. Five tone variations (monochrome, normal, hard, vivid and sepia) means you can produce sepia-style prints.
 2. Additional effects (sharpness, soft focus, canvas and parchment) have been included. For example, for a final output to look like it's been printed on canvas, choose the canvas option.
- Option to enhance images manually.
- 4 picolitre Ultra Micro Dot printing - produces images that are so fine-grained, they are virtually indistinguishable from photographs.
- PC and Macintosh compatible, and offers the advantages of USB connectivity.



EPS177

\$535

WebSearch Code: EPS177

PRINTERS & CONSUMABLES

EPSON Stylus Photo 1200

The ultimate A3+ photo reproduction quality inkjet printer for graphic artists & professional photographers

The STYLUS PHOTO 1200 works as an artist would, using large ink dots for solid colours and smaller-sized dots for blends and gradations. This makes colour accuracy and shade clarity high. In addition, print speeds are not compromised even with the superior print quality.

Key Features:

- delivers 1440dpi, full-bleed A3 prints with ink droplets invisible to the naked eye
- handles paper sizes from 4 x 6" to A3+ (329 x 483mm)
- supports Windows 95, 98, NT 4.0, Mac and iMac systems
- includes parallel, Mac, serial and USB interfaces



EPS344

\$929

WebSearch Code: EPS344

EPSON Stylus Color 900

The fastest inkjet printer in its class

The EPSON Stylus Color 900 is ideal for the business environment, catering for different business needs such as black text, colour presentations and graphs. The combination of printing technologies ensure it is a high-speed, high-image quality printer, printing at 12ppm - an amazing one page every five seconds! It also offers flexible connectivity solutions, including USB for Windows 98 and iMac's, and Mac G3.

Key Features

- EPSON's 1440dpi x 720dpi high quality printing
- Fully networkable with Ethernet 10/100 BaseT
- High capacity ink cartridges
- 3 pl droplet size - smallest dot size in the market!



EPS176

\$775

WebSearch Code: EPS176

EPSON Stylus Photo 700

A4 Photo Reproduction Quality at home

Introducing the first Photo Reproduction Quality printer for the home. Combining the superior performance of EPSON's PerfectPicture Imaging System and industry-leading 1440 dpi resolution, this new printer offers the highest image quality of any home-use inkjet printer available today. What's more, it's ability to deliver both photographic colour and black text printing makes it ideal for ALL your home printing needs.

- 6 colour ink formulation straight out of the box
- EPSON's 1440 dpi x 720 dpi photo quality printing
- 12mth Warranty with upgrade to 3yrs Warranty



EPS312

\$415

WebSearch Code: EPS312

EPSON Stylus Color 460

The perfect introduction to colour printing for the home user

Key Features

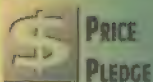
- 720 x 720dpi, with EPSON's PerfectPicture Imaging System - creates picture-perfect images and clear sharp text every time
- PhotoEnhance 4 technology - analyses digital images and enhances them for the best final output
- Poster Tiling function - divides an image and prints across A4 multi-pages to join to make a poster
- Automatic Mode - adjusts colour and print quality automatically to achieve optimum results
- Printer driver software for MS Window 95/98/NT4.0
- On-screen status monitor - confirms ink levels and printer status at a glance
- Easy installation and set-up



EPS388

\$255

WebSearch Code: EPS388



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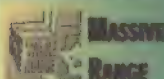
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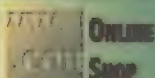
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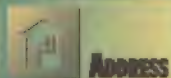
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CONDITIONS**

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Tax. Prices subject to
change, see page 46 for
terms and conditions.



EXPRESS ORDERLINE 1300 300 003

Astra 2000U

The Smarter Colour Scanner That Makes Scanning Simple

The UMAX Astra 2000U provides an ideal scanning solution for all of your photos and documents. It's never been easier to add text to brochures, flyers, web pages and presentations.

The Astra 2000U provides support for both Windows 98 and Macintosh (including iMac) systems, that support the USB interface.

Set up of the scanner simply involves plugging in and installing the software

- Optical Resolution - 1200 x 600dpi
- Maximum Resolution - 9600 x 9600dpi
- Colour Scan Method - Single Pass Colour CCD
- Maximum Scan Area - 216 x 297mm
- Colour Mode - 36 bit
- Hardware Interface - USB
- Bundled Software - VistaScan with MagicMatch
- Presto! PageManager BE
- Adobe PhotoDeluxe
- UMAX Copy Utility
- Caere OmniPage L.E.
- Recognita Standard OCR



UMA024

\$215

WebSearch Code: UMA024

EPSON Perfection 610 USB

An entry level scanner ideal for the home

SOHO and small business user. The Perfection 610 produces smooth edges on line art, crisp and dark print, true colours on photos and subtle shadings plus, it allows you to scan at the touch of a button! Simply press the 'start' button on the scanner and the scanner launches the program and loads the image. Capture virtually any image you can find, and turn it into something truly unique. For the home user, this can be professional-looking greeting cards and calendars that showcase personal photos. While for business users, a strategically placed graphic will enhance your report or presentation immeasurably.

Features:

- 36-bit colour depth, 12 bit greyscale
- 600x1200dpi optical resolution
- 600x2400dpi max hardware resolution
- 9600dpi enhanced resolution
- Platform support for MS Win 98, iMac, Power Mac G3
- A4 letter scan size

Bundled with everything you need to start scanning straight away, including:

- NewSoft Presto! PageManager - for one-button scanning
- Adobe PhotoDeluxe - for image touch-ups and photo processing
- EPSON PersonalCopy - lets users instantly turn scans into colour copies*
- Adobe Acrobat Reader 4.0
- EPSON Twain

* when combined
with an EPSON
STYLUS inkjet
printer, purchased
separately

EPS387

\$315

WebSearch Code: EPS387

Astra 2100U

The Smarter Single Touch Scanning Solution

The UMAX Astra 2100U provides an ideal scanning solution for all of your photos and documents. It's never been easier to add text to brochures, flyers, web pages and presentations. One Click: Scan, Copy and E-mail or OCR for fast results.

The Astra 2100U offers an easy connection with a Universal Serial Bus Interface, the latest advance in scanner and peripheral technology! Built with a 36-bit colour CCD plus BET, the Astra 2100U captures an amazing 68.7 billion colours to bring all your images to life.

With a USB interface, setting up a scanner has never been easier, simply plug in and install the software

- Optical Resolution - 1200 x 600dpi
- Maximum Resolution - 9600 x 9600dpi
- Colour Scan Method - Single Pass Colour CCD
- Maximum Scan Area - 216 x 297mm
- Colour Mode - 36 bit
- Hardware Interface - USB
- Bundled Software - VistaScan with MagicMatch
- Presto! PageManager BE
- Adobe PhotoDeluxe
- UMAX Copy Utility
- Caere OmniPage L.E.
- Recognita Standard OCR



UMA025

\$299

WebSearch Code: UMA025

Canon FB630U

The Easy-to-Use USB Colour Scanner

With the new Canon FB630U Scanner, not only do you get the performance and convenience of USB connectivity, you can copy, fax or email at the press of a button. The CanoScan Toolbox software lets you copy documents, and then send the data straight to your printer, email software or fax software. What could be easier?



Bundled software includes:

- OmniPage LE 5.1
- Super-slim design - only 39mm high!
- Canon CanoCraft Copier 3.7
- Canon Mac Plugin 3.3
- CanoScan Toolbox
- Mac Adobe PhotoDelux 2.0

Features:

- 600 x 1200dpi resolution
- Scanning depth of 36 bit
- Full iMac and Mac G3 compatibility, as well as Windows 98
- Ulead PhotoExpress 2.0

CAN256

\$225

WebSearch Code: CAN256

UMA014	UMAX Astra 1220P (Parallel)	\$135
UMA015	UMAX Astra 1220S (SCSI)	\$389
UMA021	UMAX Transparency Adaptor	\$249
HWP399	HP PhotoSmart S20 Scanner	\$949
PRO517	Microtek ScanMaker 9600XL	\$3369
OMN019	OmniPage Pro 10 Upgrade (OEM)	\$179
XER005	Xerox Pagis Pro 3.0	\$209
XER007	Xerox Textbridge Pro 98	\$49

CAN254	Canon FB630P Scanner	\$189
CAN253	Canon FB330P Scanner	\$139
UMA026	UMAX Astra 2400s+ (for PC)	\$1249
UMA027	UMAX Astra 2400s+ (for MAC)	\$1249
HPS034	HP ScanJet 4200C	\$299
HPS035	HP ScanJet 6350C	\$1149
HPS036	HP ScanJet 6390C	\$185 (None) 9
EPS359	Epson GT 7000 USB Scanner	\$399



MICROTEK ScanMaker X6

The Microtek ScanMaker X6 offers a sharper image, much higher resolution, superior colour accuracy and much better shadow detail compared to entry level scanners. A better scanner means you don't waste your time correcting every scan.

The SCSI version includes a genuine Adaptec 1505AE SCSI card which lets you daisy chain other external SCSI devices (e.g. SCSI Zip drive, tape drive, CD writer, slide scanner).

Software bundle includes: Adobe PhotoDeluxe, ULead Photo Impact, Photo Assistant, OmniPage LE, Paper Master SE and ScanWizard!

Features:

- 4 times the definition of entry level scanners
- 1200 x 600dpi Optical
- 9,600dpi Interpolated
- A4 Size
- Zero Reflection Design
- Digital Photography Magazine Editors Choice
- Advanced Image Enhancer
- Digital Photo FX Magazine 4 1/2 /5 "Delivers great result"
- Great bundled software
- Tri-linear CCD sensor array
- Dynamic range: 3.2
- Low Cost Transparency Option
- True 36 bit colour processing (1 pass)
- 720,000 dots measured per square inch!
- Very compact



pc world
BEST BUYS



SCANNERS

Transparency Adaptor
PRO524

\$179

SCSI
PRO523

\$385

USB
PRO033

\$355

WebSearch Code: PRO523
WebSearch Code: PRO033

HP ScanJet 3300C

The easiest to use home scanner for Windows 98

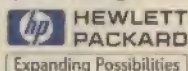
If you want an easy scanning solution, try the HP ScanJet 3300C colour scanner. Setup is a breeze with a Universal Serial Bus (USB) interface - just plug it in! Step-by-step instructions are quick and easy to follow. You can scan or copy at the touch of a button. And it's all from the number-one market leader in scanner technology.

Features:

- A4 Flatbed, one-pass colour and monochrome scanner
- 600dpi optical, 600 x 1200dpi hardware, 9600dpi enhanced
- 36-bit colour
- For PCs with USB and Microsoft Windows 98
- Convenient scan and copy buttons on the front
- HP Intelligent Scanning Technology delivers great results automatically

Includes:

- HP PrecisionScan LT - scanning software with OCR
- HP ScanJet Copy Utility
- Adobe PhotoDeluxe Home Edition - photo editing and creative projects software



Expanding Possibilities

WebSearch Code: HPS038

HPS038

\$249

MICROTEK ScanMaker 4

The MICROTEK ScanMaker 4 is both a professional quality flatbed scanner and a transparency scanner using Microtek's patented E.D.I.T. technology! Special film holders are used to scan slides & transparencies directly inside the scanner, thereby eliminating the loss of optical quality caused by glass. Compared to cheaper scanners, the ScanMaker 4 delivers better line art, better shadow detail and improved clarity especially when scanning transparencies.

Features:

- Patented E.D.I.T. technology
- 36 bit colour
- 1200x600dpi optical
- 3 light sources
- Dynamic range 3.30
- Very Fast
- Includes Adaptec PCI SCSI

Bundled with professional software including:

- Silverfast
- ScanWizard Pro
- MSP ColorSync scanner profile software
- Photoshop 5 LE
- Omnipage LE OCR

pc world
BEST BUYS

PRO528

\$1329

WebSearch Code: PRO528



HP ScanJet 5200C

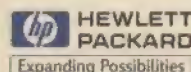
HP's fast, accurate, Internet-ready colour scanner for great results every time - no experience required

The HP ScanJet 5200C Business Series colour scanner delivers quality results up to three times faster than other scanners. One button starts any project!



Features:

- HP's Intelligent Scanning Technology delivers crisp, accurate images every time
- 600dpi optical, 9600dpi enhanced
- On-line e-mail and web task software
- USB and Parallel Port capable
- Preview outline by region type
- Auto page format retention
- Additional software - Adobe PhotoDeluxe Business Edition, valued at \$99
- Get photos, logos, drawings and text at optimal settings - in a single scan
- Preserve page format when you want to scan a whole document - and edit each element independently from one scan!
- Shrink or enlarge black-and-white drawings right in your application, with no worries about jagged effects!



Expanding Possibilities

WebSearch Code: HPS026

HPS026

\$465

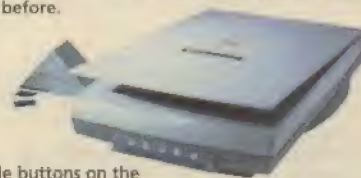
HP ScanJet 6300C

Rapid and easy professional colour scanning

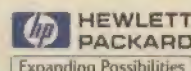
Beat the odds with a desktop solution that helps you increase your productivity with lightning speed. Copy up to five pages per minute. Better yet, complete tasks four times faster. With the new HP ScanJet 6300C, you can become more effective at creating, incorporating, manipulating, sending and storing information than you've ever been before.

Features:

- A4 Flatbed, one-pass colour and monochrome scanner
- 1200dpi optical, 1200 x 2400dpi hardware, unlimited enhanced
- 36-bit colour
- Dual I/O: USB & optional SCSI
- Convenient scan, copy, e-mail, fax and file buttons on the front
- HP Intelligent Scanning Technology delivers great results automatically
- HP ScanJet Adapter lets you scan 35mm slides with ease



Also included: CD-ROMs with HP PrecisionScan Pro scanning software with OCR, HP PrecisionScan LAN, HP ScanJet Copy Utility, Electronic Help Tools Suite, Caere PageKeeper 3.0, Adobe PhotoDeluxe Business Edition 1.1, and Adobe PageMill 3.0 Web creation software.



Expanding Possibilities

WebSearch Code: HPS037

HPS037

\$995



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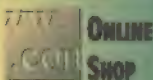
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- Next day*
- International*

* where applicable



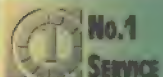
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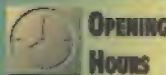
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3COM U.S. Robotics 56K* Voice Faxmodem

Includes V.90 ITU 56K standard and x2 technology

Experience the Internet like never before! Grab graphics-rich Web pages, e-mail, huge data files, real-time sound and video faster, play intense games, get more done online. Compatible with both the V.90 ITU 56K standard and x2™ technology. Includes a CD-ROM jam-packed with great software for work and play. Visit www.3com.com/56k for a compatible Internet provider near you or call us on 1300 300 003.

Key Benefits:

- Number 1 selling modem in the world
- Brings you great Web sites faster
- Software upgradable for future enhancements

* Can receive up to 56Kbps. Actual speeds may vary.
Requires compatible phone line & server equipment.

WebSearch Code: USR104

USR104

\$219

Xircom RealPort Ethernet 10/100 + Modem 56

The RealPort Ethernet 10/100 + Modem 56 combines 10/100Mbps Ethernet, 56K modem, GSM, AMPS cellular and ISDN connectivity, in a single cable-free Integrated PC Card solution. GlobalACCESS features make it easy to connect to information from any location, anywhere in the world.

The revolutionary RealPort Integrated PC Card family solves the number one problem mobile users experience with PC Cards today—lost, forgotten, or broken cable connectors and broken pop-out jacks. Patented RealPort Integrated PC Cards provide robust and reliable communications by integrating connectors directly into the card. With RealPort Integrated PC Cards there are no cables and no hassles. Connecting to information in the office or on the road has never been easier.

WebSearch Code: XIR048

XIR048

\$619

AVTEK Megamodem 2000

Data fax voice modem

- K56flex/V.90 Dual Mode
- Rockwell chipset
- Year 2000 OK
- Simple to set up and use
- Fax direct from your PC
- Voicemail messaging
- SVD + full duplex speakerphone

WebSearch Code: AVE002

3Com U.S. Robotics 56K* External Professional Message Modem

3Com's new range of 56Kbps V.90 standard desktop modems - the 3Com U.S. Robotics 56K V.90 External Professional Message Modem and 3Com U.S. Robotics 56K V.90 External Message Modem - enable users to meet all of their data, voice and message management needs with a single product, guaranteed to provide an enhanced and productive Internet experience.

Features:

- Faster Internet access
- Caller ID
- One-button access to voice messages
- Remote retrieval of voice messages through a dial-up connection
- Built-in high quality speakerphone
- Easier installation and use
- V.80 (video conferencing) capable
- Software upgradeable for future enhancements
- Backed by a Lifetime Limited Warranty
- Valued-added Connections CD-ROM Software

* Can receive up to 56Kbps. Actual speeds may vary.
Requires compatible phone line & server equipment

WebSearch Code: USR105

USR105

\$279

Xircom RealPort Modem 56

The Xircom RealPort Modem 56 offers mobile users high-speed 56K modem functionality in a robust Integrated PC Card with built-in connectors.

Features & Benefits:

- Integrated modem and telephone handset pass-thru connectors provide reliable cable-free connectivity
- LEDs for status information at a glance
- Telephone handset pass-thru allows receipt of incoming calls without disconnecting the modem cable
- Digital Shield protects modem from high-current digital phones lines
- Supports wide range of network operating systems including Windows 95/98 and Windows NT
- Wake-on-Ring reduces power consumption by detecting the ring of an incoming call and allowing receipt of information when the system is powered down
- Integrated PC Card reduces support calls, user down time and eliminates cable replacement

WebSearch Code: XIR064

XIR064

\$255



AVE002

\$139



ABC Modems

ABC Internal Modem

For only \$79 you get this fast, simple to use, easy to install, best selling modem. The 56K, V.90, internal modem is perfect for users of all levels and ideal if you are limited for working space.

Features:

- Auto Select - 56K flex/V.90
- Webstation software
- 100 hours Internet Starter Kit
- 1300 help desk
- 5 years warranty



AusLinx

WebSearch Code: ABC004

ABC004

\$79

AusLinx

WebSearch Code: ABC003

ABC003

\$99

ABC PC Card PCMCIA Modem

Easy to set up. Easy to use. Easy as ABC

- Dual mode 56K flex/V.90
- Low Power Consumption
- Webstation software
- 1300 help desk
- 5 years warranty
- 100 hours Internet Starter Kit
- Able to work with notebooks using popular operating systems such as Windows 3.1, 95 & 98
- Global Compatibility
- Green Mode



AusLinx

WebSearch Code: ABC005

ABC005

\$159

WaveSP 56

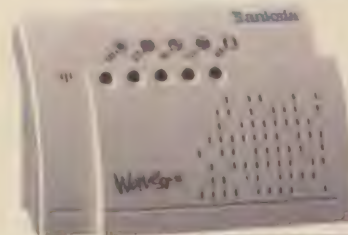
The fully featured 56,000bps modem!

Includes:

- High speed data transmission at 56,000bps (v.90 standard)
- Microsoft Internet Explorer for Internet surfing & Web site construction
- Ultra connect for faster connections and downloads
- Simultaneous voice & data (SVD) transmission
- Full duplex speakerphone (hands free telephone)
- Fax transmission at 14,400bps
- Fully featured smart answerphone with multiple voicemail boxes
- A radical new shape for optimum audio performance
- The best new games

\$30 CASHBACK*

* Limited Offer, ends 31st December 1999. Call for details.



Banksia

BAN003

\$219

WebSearch Code: BAN003



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- Full duplex speakerphone (FDSP) mode
- Fax modem send and receive rates up to 2880bps
- 32-bits PCI local Bus Interface
- Speaker volume control and muting



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DLK033

\$65

WebSearch Code: DLK033

*While stocks last

NetComm Roadster II 56

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- Rockwell chipset
- Ultra Connect for faster connections and downloads
- Headset included
- Free Symantec WinFax Pro

\$30 CASHBACK*

* Limited Offer, ends 31st December 1999. Call for details.

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WinFax Pro

Ultra



NET147

\$219

WebSearch Code: NET147

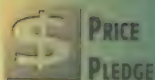
USB



NET028

\$219

WebSearch Code: NET028



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We cut prices not
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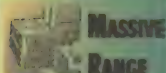
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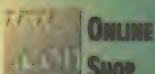
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least 95% of ALL
the items we sell



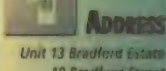
**ONLINE
SHOP**

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store at
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**No.1
SERVICE**

As an international
company we have won
more awards for products
and services than any
software mail-order
company



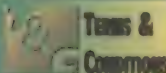
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New South Wales
2115



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Sales Lines open
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Monday to Friday
10.00am - 3.00 pm (EST)
Saturday



**TERMS &
CONDITIONS**

All prices include Sales
Tax. Prices subject to
change, see page 46 for
terms and conditions.



EXPRESS ORDERLINE 1300 300 003

FlyVideo 98

LifeView's new FlyVideo 98 boasts the latest in TV viewing, video capture, and internet broadcast reception. Just add this Plug and Play compatible board into your PC and you are ready to go! Now you can capture high quality still video or full-motion video footage. Add these video images to your multimedia presentations, demos, or web pages.

FlyVideo 98 comes with an intuitive interface making all capture and viewing functions a snap to do. You can make all fine tuning adjustments, volume control, and viewing styles right on screen!

Features & Benefits:

- 125 channel built-in and cable ready tuner allows crisp TV or video viewing in a sizeable scalable window on your PC monitor.
- Capture & image quality up to 640x480 (NTSC) and 768x576 (PAL).
- Supports up to 1280x1024 and 24-bit desktop viewing.
- Full Motion Video Capture up to 30 fps to AVI file format.
- Still Frame Video Capture saves to BMP file or Clipboard.

Bundled with:

- VideoLive Mail – Record live video and audio, then send them to your friends and family over the Internet.
- Microsoft NetMeeting – Hold live videoconference sessions over a local network or the Internet.

* Limited time only

WebSearch Code: ASS026
WebSearch Code: ASS027



ASS026

\$139

Fly Video 98 FMR with Remote
Control + FM Radio Tuner
ASS027

\$189

Life TV USB

Now you can watch TV, play your favourite movie, video conference, edit your own video files, or send video e-mails from a single product connected to your USB port.

The all new USB LifeTV is the latest offering from Lifeview. LifeTV allows you to receive TV programmes and capture the live video into AVI files, turning your PC or notebook into a versatile TV station for terrestrial and cable TV reception. With hot plug and play capabilities, there is no need to turn off your PC when installing. And as an external USB device with low power consumption, it is ideal for notebook computers.

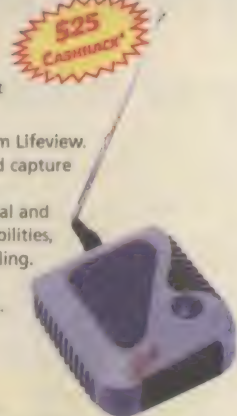
USB port required. Windows 98 only.

Features & Benefits:

- Full motion capture (352x288 at up to 30fps)
- Single frame capture using software snapshot or unique hardware snapshot (up to 640x480)
- Video capture from TV tuner, or any externally connected device (such as VCR or Camcorder)
- Send Video mail messages over the Internet using Video Live Mail
- USB Plug-N-Play
- Twin compatible for software snapshot directly to any picture editing software which supports twain scanners

Bundled with:

- NetMeeting for Video Conferencing
- Cyberlink Video Live Mail, Greeting Card, and Image Browser



ASS025

\$299

WebSearch Code: ASS025

* Limited time only

Hauppauge!

Bring TV To Your PC With WinTV!

WinTV-Primio, WinTV-PCI and WinTV-Radio PCI Boards give you live video-in-a-window!

Hauppauge's WinTV Boards are single slot PCI cards with 125-channel TV-tuners. The TV-source can be from aerial or cable set top box TV. With the external audio/video inputs, you can also connect to a satellite receiver or VCR, camcorder or video camera. These PCI boards connect to your cable TV or to a TV antenna, and display live TV in a resizable window. They do this by digitising the live video (from either the built-in 125-channel cable TV tuner or the external video-input source) using high quality 4:2:2 video sampling. The digitised video is sent over the PCI bus into the memory of a VGA display adapter, a technique which makes the WinTV PCI boards easy to install and gives a great looking TV picture!

The WinTV-PCI and WinTV-Radio support InterCast data reception and Teletext data reception. Included is our VTPlus software, for multiple teletext page display and DDE (dynamic data exchange). While live video is being displayed, these boards can also extract either InterCast data (Channel 7 in Sydney and Melbourne) or teletext data from the TV signal.

- Live TV-in-a-window on VGA monitors from 640 x 480 to 1600 x 1200 pixels in up to 16 million colors- unique to WinTV.
- Built-in cable ready TV tuner: a 125-channel TV tuner with automatic channel scan.
- Resize the WinTV window from icon size to full screen (or any size in between).
- Auxiliary audio/video input connects to video cameras, VCR's and camcorders.
- Audio output can go to your sound card's Line-In connector or to self-powered speakers.
- Capture professional quality 24-bit images with 4:2:2 digitizing.

* May not be compatible with all graphics cards, please check compatibility with our sales consultants *

WebSearch Code: HAU001
WebSearch Code: HAU002
WebSearch Code: HAU003

WinTV-Primio (with PAL
B/G Tuner and Television)
HAU001

\$199

WinTV-PCI (with PAL B/G Tuner,
Teletext decoder, full Stereo Sound)
HAU002

\$255

WinTV-Radio (with PAL B/G Tuner
and Teletext, FM Radio, InterCast)
HAU003

\$325

**Now! Now
with Remote
Control.**



DIA050	Diamond Monster Sound OEM	\$129	ASS022	AiTech CapView (\$10 CashBack for limited time).....	\$139
DIA052	Diamond Monster MX300 S-C	\$139	ASS018	AiTech WaveWatcher Net TV 98	\$249
DIA044	Diamond Monster II Voodoo OEM (PCI).....	\$189	CRE049	Creative GraphicsBlaster Riva TNT 16MB (AGP)	\$255
DIA034	Diamond Monster Fusion OEM (AGP)	\$179	VOO003	Voodoo3 2000 PCI.....	\$349
DIA058	Diamond Viper V770 16MB OEM (AGP)	\$129	VOO001	Voodoo3 3000 AGP.....	\$439
DIA059	Diamond Viper V770 32MB OEM (AGP).....	\$339	VOO002	Voodoo3 3500 AGP.....	\$679
DIA056	Diamond Viper V770 32MB Retail (AGP).....	\$355	LOG093	Logitech QuickCAM Pro USB	\$299
DIA057	Diamond Viper V770 32MB Ultra (AGP)	\$399	PIN025	Pinnacle Miro MP10	\$699



TURN ORDINARY VIDEOS INTO EXTRAORDINARY VIDEOS WITH

Studio DC10 Plus

Features:

- Pinnacle's award winning Studio editing software which offers users simple drag and drop editing, plus 100s of special effects.
- TypeDeko titling software for giving your productions professional looking titles.
- SmartSound Studio software for generating background music and for adding narration or a CD soundtrack to your movies.
- Microsoft Direct Show technology for instantly previewing your movie.
- The ability to output AVI files for the internet.
- Microsoft Net Meeting software for video conferencing.
- Hot Keys unlimited free technical support and 60-day money back guarantee.

Internal/External	Internal
Disk Space (1/2 hr vid)	1.5GB-10GB
Max Resolution Capture	760x576
	50 fields/sec
Output	768x576
	50 fields/sec
Import AVI files	Yes

Note: Studio DC10 Plus replaces: Miro DC10, Miro DC20, and Miro DRX

RECOMMENDED PC REQUIREMENTS

Processor	P233 or Celeron 300A
Hard Drive	8GB
RAM	64MB
SCSI Drive	Yes*
Operating System	Win95/98

* Required for capture rates above 3MB/Sec.



PIN024

\$599

MULTIMEDIA

Pocket Scan Converter (PSC 1106)

The Low Cost PC-to-TV Display Solution

Using the Pocket Scan Converter in conjunction with your notebook computer (or PC), any presentation can be displayed on a TV or recorded onto video tape, making the Pocket Scan Converter ideal for business, education and training applications. This compact device simply plugs into your notebook/PC and the other end into a TV/Video to put your presentation onto the big screen. And when the work is done, play computer games on your TV. Designed with flicker reduction circuitry and VHS support, the Pocket Scan Converter produces extremely vivid, high quality images with up to 16.8 million colours.



AS5001

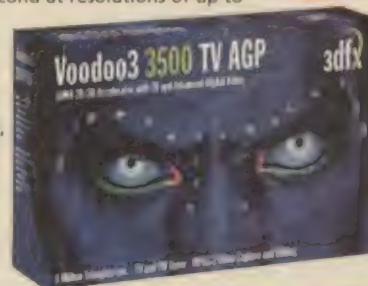
\$189

Voodoo3 3500 TV AGP

16MB 2D/3D Accelerator with TV and Advanced Digital Video

Features:

- Built in TV OutPut
- 183Mhz Voodoo III 3500 AGP board delivers up to 8 million triangles and 366 Megatexels per second at resolutions of up to 2,048 by 1,536 pixels.
- 3DFX's proprietary flat-panel support.
- Realtime MPEG-2 Video and Intelligent TV-Tuner and Digital VCR, VisualReality.
- 350MHz RAMDAC, TV/S-Video Out capabilities.
- Latest Game/Software Bundle with 16MB of SGRAM.



VOO005

\$599

ATI All-in-Wonder

All-in-one TV, video and editing multimedia

Everything you need in one great product. The All-in-Wonder even features real-time video compression for recording TV programs without using too much space.

- 128 bit, 3D, 2D and 2D PCI graphics card
- DVD through PC or home theatre
- TV Tuner
- Web TV
- Video Editing
- TV Out
- DVD Hardware



ATI031

\$399

ATI Rage Fury

The ultimate 3D gaming board

This board is powered by ATI's Rage 128 graphics technology with a huge 32MB of memory. Its fully enabled AGP 2x graphics board will power all of your favourite graphic intensive gaming and entertainment applications for explosive 3D gaming action.

- 32MB SDRAM
- 128-bit accelerator
- 250Mhz ramdac
- TV-out
- Twin cache
- Built in DVD hardware
- Designed for gamers

* box shot for illustration purposes only



32 MB

ATI030

\$279

ATI Xpert 2000

Avoid the pitfall of high graphics costs by adding 32MB and DVD in one solution

Gives PCs 32MB of graphics memory at the price of 16MB! Perfect graphics upgrade for Pentium II 300Hz (or compatible) systems and up.

- 32MB of powerful memory
- 128-bit RAGE 128 graphics engine
- Incredible 3D and 2D graphics
- Hardware DVD video playback
- 32-bit true color 3D graphics up to 1920x1200
- 2D graphics up to 1600x1200@85Hz
- Full DirectX, Direct3D and OpenGL acceleration
- Shattering the Price-Performance Barrier



* box shot for illustration purposes only

ATI033

\$239

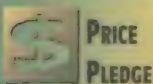
WebSearch Code: AS5001

WebSearch Code: VOO005

WebSearch Code: ATI031

WebSearch Code: ATI030

WebSearch Code: ATI033



**PRICE
PLEDGE**

We will not be
beaten on price!
We cut prices not
corners.



**FREE
GIFT**

Make sure to ask
for your free gift
when ordering.



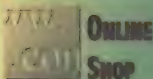
**FAST
DELIVERY**

Full range of
delivery options:
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• Next day*
• International*
*where applicable



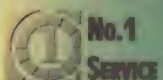
**MASSIVE
RANGE**

We aim to stock at
least 95% of ALL
the items we sell



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EXPRESS ORDERLINE 1300 300 003

Compro PS39 Digital Video Camera-USB

COMPRO PS39 Digital Video Camera offers great convenience of plug and snap on any Windows PC or notebook. Simply connect the camera to the USB port, a quick software installation and you are ready to take a brilliant picture, or video conference at life like frame rates.

Superior features:

- 40 frames per second (video images)
- 1280 x 960 resolution at 16.8 million true colour still images
- Superior image quality without compression
- Adjustable focus Lens (10mm to Infinity)
- Low lux capability
- Plug and Snap on all PC and note-book USB ports
- Includes PS2/AT Keyboard Adaptor, removable tilt and swivel base assembly, user manual



Great for:

- Personalised greeting card and t-shirt transfer
- Picture & Video E-mail
- Video Conferencing
- Internet Home Page creation
- Jazz up reports/presentations
- Picture ID
- Digital photo album and more...

Comes with CD containing:

- Snapshot Image Capturing Software
- AVI Software Driver
- TWAIN Software Driver
- Microsoft NetMeeting 2.0 Video Conferencing Software
- ULEAD Video Studio Software
- Compro Microphone



WebSearch Code: CMP013



CMP013

\$289

RoboCAM

USB Digital Camera

- Plug & play (USB) interface for easy installation
- Capture up to 30fps (352 x 288 pixels) full motion video
- Support single frame snapshot up to 640x480 pixels
- Low power consumption ideal for notebook computers
- Support TWAIN interface for image editing applications
- Crystal clear picture
- No video capture card or power adapter necessary



WebSearch Code: ASS023

* Limited time only

ASS023

\$179



Colour co-ordinated for the fashion conscious users. The stylish blueberry will enhance the normally boring PC's. iMac drivers available.

ASS024

\$179

WebSearch Code: ASS024

* Limited time only

Avermedia Intercam The Fastest USB Camera in it's class!

Features:

- USB interface for true Plug and Play
- Snapshot button for still capture
- High resolution video capture (up to 10 frames/sec @ 640 x 480)
- Up to 30 frames/sec @ 320 x 240 for conferencing
- Compatible with Windows 98 only
- Adjustable Lens
- 54 degrees field of view
- Full automatic white balance control



Includes Acer EasyAccess video conferencing software, MGI 2PhotoSuite, Acer ExpressVideo Mail and Avermedia capture utility.

WebSearch Code: AVE004

AVE004

\$149

Robo Snoop

RoboCam USB Digital Camera Plus PC Snoop

Video Conferencing, Personal Surveillance/Receptionist & Message Recorder Combined. "Robo Snoop" will allow users the option to perform video conferencing, surveillance, video capture, receptionist duties & message recordings, all for a great price.

RoboCam USB Camera delivers crystal clear pictures with the latest CMOS 300K technology.

PC Snoop integrates Stealth surveillance & Video Message Recording for Home & Office applications.



**ALSO
AVAILABLE IN
BLUEBERRY iMAC**



ASS017

\$275

WebSearch Code: ASS017

* Limited time only

LOG090	Logitech QuickCAM Video Conf. USB	\$175	XIR271	Xircom RealPort GSM Kit Ericsson	\$245
SONY55	Sony Mavica FD83 Digital Camera	\$1589	NET160	Netgear 10Mbps Network Starter Kit.....	\$189
SONY50	Sony Mavica FD88 Digital Camera	\$2029	BAY165	Netgear 100Mb Network Starter Kit	\$329
KOD050	Kodak DC280 Digital Camera	\$1789	DLK016	D-Link Network Starter Kit	\$179
KOD017	Kodak DC210	\$1049	CAB024	Patch Cable RJ45 UTP 10M	\$35
KOD045	Kodak DC265 Digital Camera	\$1795	CAB026	Patch Cable RJ45 UTP 20M.....	\$69
KOD046	Kodak DC240 Digital Camera	\$1295	HPN005	HP ProCurve 10BT 8PT Hub.....	\$139
QUA188	Quasar True Blue Hardware	\$169	LAK121	Pinnacle Blue Box	\$215



10/100Mbps CardBus PC Card

DFE-660TX (10BASE-T/100BASE-TX dual-speed PC card base unit with media coupler)

High Performance

This is a 32-bit high-performance dual-speed 10/100Mbps CardBus PC card designed to permit users on a move to easily connect to a network and share databases and resources in diverse environments. Supporting 20Mbps/200Mbps full duplex, this adapter is engineered to unleash the power of today's notebooks and turn them into robust stations or servers.

Nway 10/100Mbps Interface

The card's single connector connects to either 10BASE-T Ethernet or 100Base-TX Fast Ethernet completely without any need to set configuration. It detects the connected hub's capability and auto-negotiates to use the highest available speed.

Full Duplex Support

Full/half duplex operation is auto-detected in both 10BASE-T and 100BASE-TX modes. In full-duplex, the notebook is connected to a switch on a dedicated segment. With transmission and reception taking place simultaneously, data transfer is doubled. Mobile users can thus hook to a network and turn their notebooks into power servers.

Features

- 32-bit CardBus PC Card.
- 10/100Mbps dual-speed Nway interface.
- Half/full duplex supported.
- Single shielded RJ-45 connector.
- PC Card CardBus standards 68-pin front-end connector.
- 15-pin back-end connector for media coupler.
- UTP/STP cabling supported.
- Menu-driven network O.S. installation program.
- FCC Class B, CE Mark, VCCI Class B, C-Tick.
- Win95/Win 95 OS R2/Win NT 3.51/Win NT4.0.
- Packet driver for FTP PC/TCP.
- Packet driver for Winsock.



D-Link
Building Networks for People

DLK033

\$169

WebSearch Code: DLK033

Ethernet Interface Adapter

DFE-530TX PCI-bus 10/100Mbps Fast Ethernet Network Interface Card

- Intelligent Ethernet/Fast Ethernet Adapter, Auto negotiating 10Base-T/100Base-TX (Nway).
- Plug and Play support. Low CPU utilisation. 32 Bit high performance.
- Optional remote boot rom. Certified driver for Netware, SCO Unix, Windows 95 and Windows NT.



DLK004

\$49

WebSearch Code: DLK004

DLK018 DFE-650 TX Fast ethernet 10/100 Dual Speed N-way
PCM1A Card with RJ-45 connectors

\$179

10/100Mbit NWay Dual Speed Hub

DFE-904

- IEEE 802.3 10Base-T Ethernet repeater.
- IEEE 802.3u 100Base-TX Class II Fast Ethernet repeater.
- 4 Ethernet or Fast Ethernet ports.
- MDI-II uplink port for easy expansion.
- Selection between Ethernet and Fast Ethernet via switch.
- Extensive diagnostic LEDs.
- Compact size, light weight.



DLK020

\$185

WebSearch Code: DLK020

DLK021	DFE-908 DX 8 port 10/100 Mbps Dual Speed Desk Top Hub with switching. Stackable	\$329
DLK022	DFE-916 DX 16 port 10/100 Mbps Dual Speed Desk Top Hub with switching. Stackable	\$839
DLK028	External 56K V90 Data/Fax/Voice Modem	\$109
DLK029	Internal 56K V90 Fax Modem	\$49
DLK024	DU-H4 4-Port USB Hub	\$75

Fast Ethernet Network Kit

DFE-905

- Easy to install, 10/100Mbps Network Kit for SOHO users.
- Includes two Cat5 20 feet cables and AC power adapter for hub.
- Includes 1 dual-speed hub and 2 auto sensing 10/100 Mbps network cards.
- Simple plug and play installation.
- Runs Windows 95, 98 NT, Netware, others.
- FCC Class B, CE Mark, VCCI Class B, BCIQ.
- Backed up by D-Link's lifetime warranty and lifetime support.

WebSearch Code: DLK017

DLK017

\$289

3-Port USB Hub + 1 Serial Port + 1 Parallel Port

DU-H35P

- 3 USB A-type ports for USB device connection, 1 USB B-Type port for Upstream connection to PC or another USB hub.
- 1 Serial and 1 Parallel port for non-USB device connection. User selectable as self or bus powered. 6 foot 'A' to 'B' cable.

WebSearch Code: DLK025

DLK025

\$159

2-Port Internet Ready Server for SoHo Networks

DP-602

- 1 x 10/100Mbps NWay Ethernet Port, 2 x RS-232 460kbs Com Ports. Supports NAT for single ISP user account, Dial-on-Demand.
- Admin through Windows based program, Web browser and telnet.
- Ethernet Print Servers.
- DHCP, PPP, PAP/CHAP Security. Dual use of Com ports for double bandwidth. Support for Analog modem or BRI ISDN TA.

WebSearch Code: DLK026

DLK026

\$459

1-Port Pocket Size Ethernet Print Server

DP-101

- Support Windows NT, Windows 95, UNIX, TCP/IP, IPX, NetBEUI and Appletalk protocols.
- With 10 Mbps Ethernet UTP interface. Supports 1 Parallel Printer via connection to Centronics port.
- Supports up to 36 Novell Netware file servers, Easy configuration through Windows, Telnet.

WebSearch Code: DLK023

DLK023

\$239



**PRICE
PLEDGE**

We will not be
beaten on price!
We cut prices not
corners.



**FREE
GIFT**

Make sure to ask
for your free gift
when ordering.



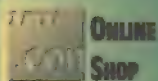
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• Next day*
• International*
* where applicable



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the items we sell



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and services than any
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Saturday



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EXPRESS ORDERLINE 1300 300 003



COREL

WordPerfect Office 2000

Finally, an office suite that understands the way you work. Perfect for your business, it's packed with features that make life easier. Increase productivity with voice-enabled word processing. Share files across most major applications and customise programs with support for Microsoft Visual Basic for Applications. Create your own business material, such as letterhead and brochures. Produce spreadsheets that give data real meaning and slide shows that really make an impact, and publish Web pages from the core applications, without knowing HTML.

It's all about getting the job done right, with suite-wide integration, you can combine text, graphics and charts in one document. WordPerfect Office 2000. Today's office solution.

WordPerfect Office 2000

Corel Presentations 9 - Create captivating, high-quality slide shows and drawings that leave a lasting impression with this dynamic presentations application. Enhanced Microsoft PowerPoint import/export capabilities. Redesigned Internet Publisher gives you step-by-step instructions on publishing a slide show to the Web.

Quattro Pro 9 - Turn numbers into meaningful information with this powerful spreadsheet program. Organise, analyse, report, manage and share data quickly. Increased notebook size now supports up to one million rows, giving you greater flexibility when converting Microsoft Excel files. Enhanced Microsoft Excel conversion capabilities.

WordPerfect 9 - Professional word processor, create outstanding documents, such as newsletters, reports, brochures, add graphics, charts and tables with ease. Enhanced Microsoft conversion capabilities. Corel RealTime Preview lets you preview formatting before applying it to your documents.

CorelCENTRAL 9 - Manage time and tasks efficiently with this effective information manager. Organise, store, and access communication and scheduling information with ease. PalmPilot Synchronisation lets you synchronise the Calendar, Event & Task Lists, Address Book & Memo applications.

Trellix 2 - Quickly organise documents and publish them to the Web without knowing HTML. Increase the availability of information throughout a corporation and reduce the workload by delegating content ownership to specific individuals.

WebSearch Code: COR560
WebSearch Code: COR548
WebSearch Code: COR546

Corel Word Perfect 8 for Linux
COR560
\$89



Corel Office 2000
COR548
\$399

Corel Office 2000 U/G
COR546
\$199



WordPerfect Office 2000 Voice-Powered Edition

Includes all the
applications in Office
2000 plus:

Philips FreeSpeech 2000

- Use the power of your voice to create, edit and format documents in WordPerfect 9. Philips FreeSpeech 2000 uses High Speed, High Accuracy technology to dramatically improve recognition rates.
- Supports dictation by multiple users in multiple languages.
- EasyEdit lets you playback text for easy proofreading.
- Explore the Web with your voice.
- Voice-enhanced word processing means users can watch their words appear on screen as they speak to their computer at a normal pace up to 160 wpm.



WebSearch Code: COR549
WebSearch Code: COR547

Corel Office Voice
COR549
\$459

Corel Office Voice U/G
COR547
\$259

Corel Paradox 9 Developers Edition

Turning Data into Information

Interpret, present and share information with an easy-to-use relational database designed for new users, experts and developers. Paradox 9 lets you see the meaning behind data, helping you make better decisions.

- Compatible and Web-ready, Paradox 9 makes it easy to exchange data across applications, including Microsoft Word and Microsoft Excel, or publish it straight to the Internet.
- Powerful tools, including ObjectPAL, let developers and advanced users create custom applications.
- Paradox 9 can run on a single computer or a multi-user network, so it's flexible enough to accommodate your changing needs.



WebSearch Code: COR549
WebSearch Code: COR547

WebSearch Code: COR332

COR332
\$599

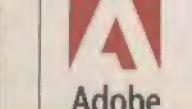
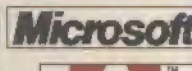
Corporate Licence

Licensing - keeps you legal and reduces cost! As more and more organisations realise the benefits of centralising their software purchasing, the Software Warehouse specialised licensing team has become an absolute necessity for many IT Buyers. The Software Warehouse Corporate Licensing team are knowledgeable and dedicated team members. They provide a low cost way of purchasing and updating your software requirements throughout your organisation.



SYMANTEC.

Lotus.





Microsoft Office 2000 Professional

Powerful tools for managing your business.

What Productivity Means Today

Microsoft Office 2000 Professional is rich in capabilities and easy to use, providing six integrated productivity applications you need to make smarter business decisions.

Features & Benefits:

- Communicate with customers more effectively. Use Microsoft Outlook to send and receive e-mail, and manage all your tasks, appointments, and contacts.
- Create powerful presentations quickly. The new Tri-Pane View in Microsoft PowerPoint makes it easy to add new slides, edit text, and enter notes - all from one window.
- Create, manage, and share a database. Microsoft Access makes it easy to organise your data and share it online for better business decisions.
- Turn your numbers into answers. Apply easy-to-use drag-and-drop tools to conduct rich interactive analyses using PivotChart dynamic views in Microsoft Excel.
- Share your work online. Create a document in Microsoft Word or any other Office application and publish to your Web server.
- Improve your effectiveness with the specialised Microsoft Small Business Tools. Communicate better with customers, access key industry resources, and generate direct mail campaigns.
- Build a presence on the Web. Wizards in Microsoft Publisher walks you through the steps to create a professional-looking Web page.

Upgrade
MSS229

ONLY \$455

\$50 CASH BACK*

*** Pay \$505 for Office Pro Upgrade & receive \$50 Cashback**



Office 2000 Pro
MSS214

\$865

WebSearch Code MSS229
WebSearch Code MSS214

* Offer valid until 15 December 1999. Offer only applies to Microsoft Office 2000 Professional Upgrade. Offer does not apply to Office Professional Open Licenses. Offer limited to one re-imbursement per customer. Cheque will be posted 2-4 weeks from receipt of Proof of Purchase.

OFFICE PACKAGES

Microsoft OFFICE 2000 FAMILY

What Productivity Means Today

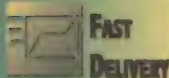
	Microsoft Word 2000	Microsoft Excel 2000	Microsoft Outlook	Microsoft Publisher	Microsoft Small Business Tools	Microsoft Access	Microsoft PowerPoint	Microsoft FrontPage	Microsoft PhotoDraw	Microsoft Developer Tools	Full Version Price & Code WebSearch Code	Upgrade Price & Code WebSearch Code
 Standard	✓	✓	✓				✓				MSS217 \$719	MSS220 \$389
 Small Business	✓	✓	✓	✓	✓						MSS216 \$719	MSS223 \$395
 Professional	✓	✓	✓	✓	✓	✓	✓				MSS214 \$865	MSS229 \$505
 Premium	✓	✓	✓	✓	✓	✓	✓	✓	✓		MSS215 \$1159	MSS221 \$595
 Developer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MSS218 \$1479	MSS222 \$865



**PRICE
PLEDGE**
We will not be
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We cut prices not
corners.



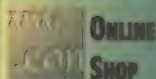
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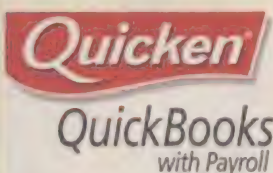
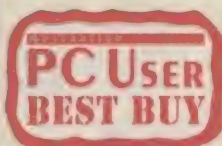
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CONDITIONS**
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terms and conditions.



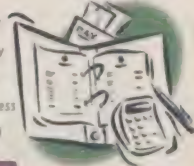
EXPRESS ORDERLINE 1300 300 003

QuickBooks & QuickBooks Pro With Payroll GST GUARANTEED

QuickPayroll Pro V6 works seamlessly with Quicken's QuickBooks V6 financial management and accounting software to transfer payroll information directly into the company's accounts.



The fastest
easiest way
to manage
your business
and payroll



QUI152
\$399

WebSearch Code: QUI152

Payroll Pro V6

"The Best and Easiest to Use Release of Payroll Ever"

1. QuickPayroll PRO is designed for small to medium sized companies, and can manage up to 999,999 employees. The software keeps track of all employee pay details, prints pay slips and transfers pays. It also tracks superannuation contributions and tax and group certificates, calculates tax payable, leave accrued, WorkCover and provides quick access to all payroll information in over 70 different report formats.

And, with recent changes in Government Legislation now requiring all employers to report FBT and back payments of salary and wages when compiling group certificates, all QuickPayroll customers must upgrade to this latest version in order to comply with the new Australian Taxation Office reporting regulations, enabling you to print directly onto the revised group certificate format.

"Taking the Stress out of Managing Your Payroll"

Used by over 18,000 Australian paymasters, QuickPayroll PRO has recently been awarded Australian PC User Best Buy.

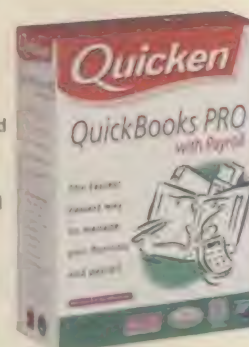
QuickBooks V6 & QuickBooks Pro V6

2. QuickBooks V6 & QuickBooks PRO V6 - QuickBooks is the world's best selling financial management and accounting system for small and medium sized businesses, and is recommended by more accountants worldwide than any other software of its kind.

"Businesses with Inventory and Double Entry Accounting Demands"

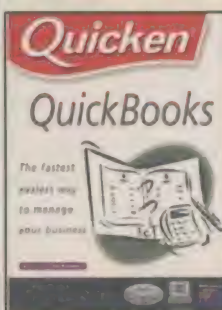
By showing exactly what you owe, to whom and when, QuickBooks 6.0 keeps track of your company's bank balances, loans and other finances, calculates charges on overdue payments, monitors unpaid bills, writes cheques, records stock and offers up to 79 different financial graphs and reports for you to access the financial status of your company at any one time. And for trouble-free tax reporting, QuickBooks 6.0 will also code each and every transaction you've made, making it the quickest and easiest way to manage your business finances.

QuickBooks PRO 6.0 has all the features and functionalities of QuickBooks 6.0, with additional time saving management tools including time tracking, estimating and job costing, where employees hours can be entered onto weekly time sheets and recorded by job number. Then, for effortless financial administration, this information flows directly to invoices.

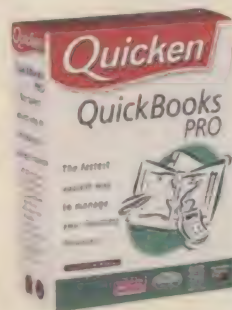


QUI153
\$489

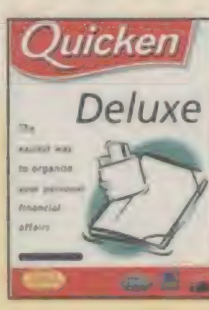
WebSearch Code: QUI153



QUI150
\$175



QUI148
\$309



QUI141
\$89

Quicken 7 Deluxe

With Quicken, organising your personal and small business finances has never been faster, more simple, or more accurate. Quicken puts and keeps you in control. Track all bank accounts, credit cards, loans, mortgages and investments. And with "Move Transactions" you can put your money where you want it, when you want it. Fast. What's more, Quicken is easier to learn, and even easier to use. All of which adds up to a clearer insight, leading to you making well informed and better business decisions.

WebSearch Code: QUI141

QUI147	QuickBooks V6 Tech Upgrade	\$89	QUI155	Quick Payroll 6.0	\$152
QUI149	QuickBooks Pro V6 Tech Upgrade	\$149	QUI156	Quick Payroll Pro 6.0	\$269
QUI151	QuickBooks Pro V6 - 5 Licences	\$869	MYO003	MYOB AssetManager	\$245
QUI152	QuickBooks V6 & Payroll	\$449	MYO028	MYOB PowerPay	\$425
QUI153	QuickBooks Pro V6 & Payroll	\$499	MSS129	M5 Money 99	\$49
QUI158	QuickBooks Pro V6 & Payroll - 5 User	\$1249	LGS004	Logisoft PayBook	\$199
QUI140	Quicken V7	\$69	LGS005	Logisoft PayPacket (up to 3 Co.)	\$399
QUI142	Quicken for Business V7	\$135	LGS006	Logisoft PayPacket Pro (unlimited Co.)	\$989



MYOB is Australia's favourite

- Handle both the current Wholesale Sales Tax (WST) and Australia's forthcoming GST.
- Used by over 160,000 Australian businesses
- Recommended by 2 out of 3 Australian Accountants
- Year 2000 compliant - see www.myob.com.au



THE AUSTRALIAN GST WILL BE UNLIKE ANY OTHER IN THE WORLD

MYOB products have the unique advantage of being developed in Australia for Australian business conditions. That's why we've built our GST products in Australia, to cater for the unique aspects of Australia's GST.

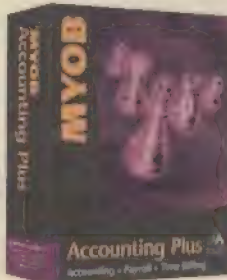
MYOB Accounting Plus v9



Accounting + Payroll + Time Billing

MYOB Accounting Plus includes all of the features found in MYOB Accounting and adds a fully integrated payroll and, for the first time, a heavy duty professional time billing module.

As well as meeting the needs of thousands of different types of small businesses, MYOB is now just right for professionals such as consultants, lawyers, accountants, graphic designers and anyone who bills by the time they spend with a client or on a project.



**GST
READY**

MYO036

\$475

WebSearch Code: MYO036

MYOB Accounting v9



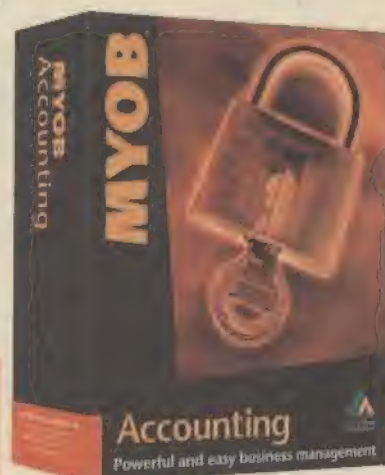
MYOB Accounting Version 9 builds on all of MYOB's award-winning features and is now ready for Australia's forthcoming GST. MYOB Accounting Version 9 handles both the current Wholesale Sales Tax (WST) and the GST with ease, which means you can start to prepare now and smoothly make the transition from WST to GST. The extensive GST features allow you to easily collect, pay and report GST. New features include: accrual and cash-based GST reports, the Australian Business Number on all invoices and statements and GST entry fields in all relevant transaction entry screens. MYOB Accounting also includes: Invoicing, Receivables, Purchasing, Payables, Cashbook, Powerful Inventory, Job Costing, General Ledger and OfficeLink - a dynamic link to Microsoft Office. Everything you need to build a better business.

**GST
READY**

MYO034

\$329

WebSearch Code: MYO034

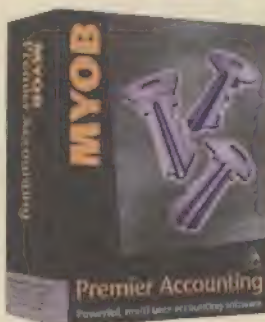


MYOB Premier v3



Multi-user accounting that's as easy as MYOB

All the accounting features of MYOB Accounting Plus, with additional features tuned for use across a network by multiple users. MYOB Premier brings the power, flexibility and award-winning ease-of-use of MYOB to multiple concurrent users. Includes access for 3 concurrent users - additional licences easily added.



**GST
READY**

MYO013

\$869

WebSearch Code: MYO013

MYOB FirstAccounts v3



Your ideal first accounting system, MYOB FirstAccounts makes it easy for you to track income and expenditure, reconcile bank statements, create and print invoices, statements, and purchase orders, track who owes you money and who you owe money to. Produce profit & loss and other key reports with a mouse click.

No business is too small for FirstAccounts. Outgrown Quicken, MSMoney? You can easily move up to MYOB FirstAccounts. FirstAccounts is designed for small service businesses and includes all the features you need today, and a growth path for the future. If, as your business grows, you want more power, flexibility and analysis you can easily upgrade to any of the MYOB Accounting products. No rekeying of data is required. You can upgrade without stopping business.

MYOB FirstAccounts v3 also adds these functions (available across the whole range):

- user-definable aging - choose 7-14-21 days or whatever you want
- electronic bill payment to save you time and money
- multiple customisable forms

Made in Australia, for Australian Businesses

Accounting and business requirements differ greatly between countries. That's why FirstAccounts has been created in Australia, for Australian businesses. No one else provides world-class software written specifically for Australian businesses.

MYOB

MYO035

\$165

WebSearch Code: MYO035



ACCOUNTING



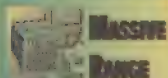
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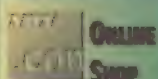
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EXPRESS ORDERLINE 1300 300 003

CorelDRAW 9 Graphics Suite

The world's number one PC
illustration and image-editing
program for professionals

Major Applications:

CorelDRAW 9 - illustration and page layout
Corel PHOTO-PAINT 9 - image editing and
bitmap creation

Suite-Wide Features

- Robust PDF support, including import and export, job ticketing, bookmarks, image downsampling and more
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- Import and export images with embedded ICC standard profiles - CPT, CDR, TIFF and EPS
- Interactive tools, including Perspective Drop Shadow, Fill, Blend, Transparency and more
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- Support for Adobe Illustrator AI, EPS and Adobe Photoshop PSD with layers, and MetaCreations Painter RIFF files

Libraries

25,000 professional clipart
1,000 TrueType and Type 1 fonts
2,500 high-resolution photos

*While stocks last



Upgrade
COR271

\$405

WebSearch Code: COR271

CorelDRAW 9 Premium Colour Edition

Enjoy phenomenal control over output quality with CorelDRAW 9 Premium Colour Edition. This sophisticated suite combines award-winning Corel graphics software with intelligent colour calibration technology from Heidelberg.

- Experience true creative freedom with the legendary vector illustration and page layout features of CorelDRAW 9 and the powerful image-editing and painting tools of Corel PHOTO-PAINT 9.
- Innovations like the Mesh Fill tool and Artistic Media brushes expand your capabilities. Robust PDF support and advanced imposition tools maximise your productivity.
- With enhanced printing features and accurate colour profiling for input, display and output devices, you'll get superb results.

*While stocks last

WebSearch Code: COR335

Upgrade
COR335

\$859

COR542	CorelDRAW Select Edition	\$79
COR270	CorelDRAW V9.....	\$749
COR561	CorelDRAW V9 Educational	\$209
COR541	Corel Gallery Magic 1,000,000	\$129
COR544	Corel Print House Magic 4 Premium.....	\$79
MSS247	MS Publisher 2000	\$149
MET036	Art Dabbler	\$69
MET028	Kai's Photo Soap 2.....	\$65

Corel PHOTO-PAINT 9

This award-winning image professional image composition and painting program is ideal for designers and digital imaging enthusiasts who edit and create images for print or the Web. Combines exceptional image composition, masking and image enhancement features with natural media brush tools in one comprehensive bitmap editing program.



- Create stunning image compositions using powerful masking tools and features, and object control.
- Take advantage of the easy-to-use visual interface to create unique natural media brush effects.
- Take advantage of the robust Publish to PDF option, including advanced text and font handling, downsampling and compression options, job ticketing capabilities, bookmark and hyperlink options, and color management options.

Libraries

1,000+ TrueType and Type 1 fonts
1,500 high-resolution photos textures and brush nibs

WebSearch Code: COR334

Upgrade
COR334

\$169

CorelDRAW 9 Office Edition

Give your professional ideas maximum visual impact with CorelDRAW 9 Office Edition. An essential complement to your business software, this dynamic graphics suite combines extraordinary ease of use with award-winning illustration and image-editing tools.

- Produce professional-looking presentations, reports, marketing material and Web pages using wizards and customizable templates.
- Create flowcharts and organizational charts quickly and easily.
- Increase your productivity with an intuitive interface and exceptional file compatibility, including full integration with WordPerfect, Corel Presentations, Microsoft Word and Microsoft PowerPoint, and seamless file transfer with CorelDRAW 9 Graphics Suite.
- Choose from a collection of business-specific clipart images and templates to enhance your work. CorelDRAW 9 Office Edition-visual communication for business.



Upgrade
COR336

\$229

WebSearch Code: COR336

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JAS009	Paintshop Pro 6.0.....	\$165
COM105	Blade Pro	\$69
COM106	Illuminatus 4.5	\$249
ADO206	Adobe PageMaker 6.5 Plus (Win)	\$795
ADO207	Adobe PageMaker 6.5 Plus (Mac)	\$795
ADO160	Adobe Illustrator 8 (Win).....	\$699
ADO161	Adobe Illustrator 8 (Mac)	\$699
MSS197	MS PhotoDRAW 2000	\$229



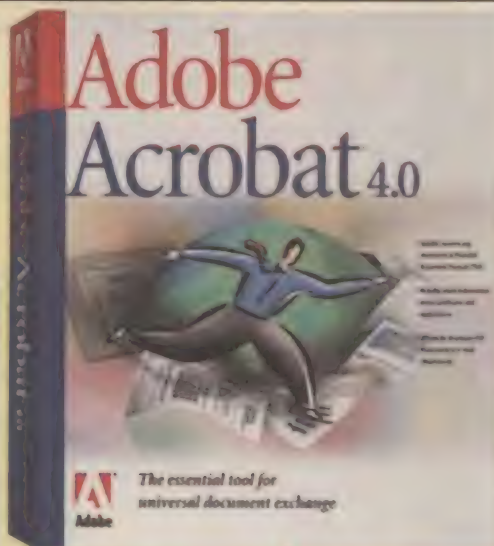
Adobe Acrobat 4

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- **Accessibility** - PDF files can be distributed in print, on the Web, on corporate servers, attached to e-mail, or on CD-ROM.



Windows
ADO178
\$395

MAC
ADO177
\$395

WebSearch Code: ADO178
WebSearch Code: ADO177

Adobe Design Collection

Unleash your creativity with powerful, integrated Adobe design tools.

Together, the programs in this collection deliver a powerful set of professional graphics, layout, and publishing tools that form the basis for an exceptionally smooth design workflow.



WebSearch Code: ADO222
WebSearch Code: ADO223



Includes:

- Adobe InDesign 1.1
- Adobe Photoshop 5.5
- Adobe Illustrator 8.0
- Adobe Acrobat 4.0

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Windows
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Adobe Publishing Collection

The complete package for the creation, assembly and delivery of printed & electronic documents

The Adobe Publishing Collection brings together the latest versions of four of the World's leading graphic software packages all in one box. But not only do they come as one - they work as one. Drag and drop features lets users move effortlessly between programs, ensuring a seamless workflow - whether for print, multimedia or online. A comprehensive and cost-effective way for users such as graphic artists to business professionals to start publishing.

Includes:

- Adobe PageMaker 6.5 Plus
- Adobe Illustrator 8.0
- Adobe Photoshop 5.5
- Adobe Acrobat 4.0

WebSearch Code: ADO204
WebSearch Code: ADO205



Windows
ADO204
\$1739

Mac
ADO205
\$1739

Adobe Photoshop 5.5

The world-standard image-editing solution for print and the Web

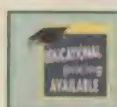
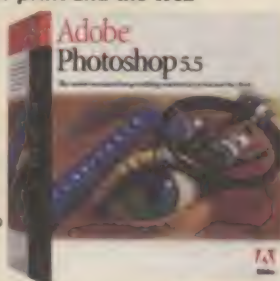
Adobe Photoshop 5.5 software offers new creative tools and Web features and gives you the power of Adobe ImageReady 2.0 for advanced processing of Web graphics.

Transform images with "painted" brush strokes, and perform complex masking tasks with professional-level precision.

Complete all your essential Web functions including file optimisation right in Photoshop, and then jump to the ImageReady application to slice layered images, produce JavaScript rollovers, and create GIF animations.

Create original artwork, retouch photos, and add special effects with comprehensive filters.

This integrated tool set maximises your productivity while helping you achieve the finest quality output.



WebSearch Code: ADO192
WebSearch Code: ADO193

Windows
ADO192
\$1059

Mac
ADO193
\$1059

Adobe InDesign

Page Layout and Design for the future of professional publishing

Adobe InDesign software is a new, state-of-the-art page layout program that delivers unprecedented creative freedom, productivity, and precision, while integrating seamlessly with Adobe's other leading design programs.

Award-winning Adobe user interface - Enjoy design tools that work together to provide a seamless creative environment. InDesign, Illustrator, and Photoshop software looks, feels, and behaves similarly because of common tools, commands, palettes, and keyboard shortcuts.

Windows
ADO181
\$1185
WebSearch Code: ADO181
WebSearch Code: ADO208

Mac
ADO208
\$1185
Available to registered users of Quark Xpress, Adobe Photoshop, Adobe Illustrator and Adobe PageMaker



Windows
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LIMITED TIME ONLY



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We cut prices not
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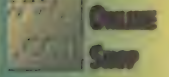
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EXPRESS ORDERLINE 1300 300 003

Visio 2000 Standard Edition

The Worldwide standard for creating & sharing business diagrams

Visio 2000 Standard Edition takes the worldwide standard in business diagramming tools to the next level. Using Visio 2000's seamless Microsoft integration, you can drag and drop flowcharts, organization charts and other business diagrams into PowerPoint, Excel and Word documents. Add brilliant new backgrounds, borders and color schemes, then leverage Visio 2000 Standard Edition's advanced Internet functionality to create, store and exchange drawings via your corporate intranet or the Web.

Features:

- Easy to Learn & Use
- Streamlined Work Environment
- Enterprise-wide Diagramming
- Microsoft Office Compatibility
- Rich Internet Support



VIS120
\$325

WebSearch Code: VIS120

Visio 2000 Technical Edition

The worldwide leader in technical drawing and diagramming

Visio 2000 Technical Edition is the leading tool for creating precise 2-D technical diagrams and drawings. Unlike CAD, it's fast and easy to use - just assemble drawings intuitively using more than 4,000 intelligent, industry-specific SmartShapes symbols. Or create them from scratch using precision drawing tools. Link shapes to a database, and generate reports instantly.

- Intelligent, dynamic design environment streamlines the drawing process, allowing nonCAD users to get right to work.
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- Powerful drawing solutions for process engineering, facilities management, AEC, electrical engineering, and more.



VIS125
\$659

WebSearch Code: VIS125

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Purchase any Visio 5.0 product between 15th August 1999 and 31st December 1999 and receive a FREE upgrade to the corresponding Visio 2000 edition.*

*Call for full details

Visio Professional 5.0

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Whether your IS/IT specialty is networks, databases, or software, Visio Professional gives you the tools to do your job and to exchange information effectively with other IS/IT personnel.

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- Share and exchange information.

A Fully Customizable Development Platform

Different jobs require different capabilities. That's why we allow you to customise virtually every aspect of Visio Professional:

- Create custom shapes.
- Integrate Visio Professional into a custom solution.
- Add ActiveX controls.
- Tap our developer resources.

Did you know that we make two products for the IS/IT professional? If you need a more powerful design and modelling tool, check out Visio Enterprise, built on the foundation of Visio Professional.



VIS106
\$599

WebSearch Code: VIS106

Visio Enterprise 5.0

Design and Model Your Enterprise Information Architecture

Visio Enterprise is the ideal tool for designing and documenting networks, modelling and designing databases, and modelling software applications across an enterprise information infrastructure.

- Streamline the design and documentation of LANs, WANs, wiring closets, and directory structures.
- Built-in SNMP-based network AutoDiscovery technology and Guided Diagramming capabilities produce diagrams of logical and physical topologies.
- Guided Updating feature helps keep diagrams current as your network changes.
- 14,000 exact-replica, vendor-specific device shapes represent your entire network in complete detail.
- Design and re-engineer databases from IBM, Informix, Microsoft, Oracle, and other leading vendors.
- Synchronize models with databases using a unique three-way comparison that detects changes made to the database since the last model-database update.
- Create customizable reports, generate and edit DDL scripts, and freely switch among multiple entity relationship notations.



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VIS121	Visio Standard 2000 Upgrade.....	\$169	AUT471	AutoCAD LT 2000 Upgrade.....	\$279
VIS126	Visio Technical 2000 Upgrade	\$329	AUT108	AutoCAD R14 Student Edition	\$375
VIS123	Visio Standard 2000 10-User Licence Upgrade	\$1389	AUT025	AutoSketch 6.0 Upgrade	\$119
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VIS104	Visio Professional 5.0 Upgrade	\$299	IMS147	IMSI TurboCAD Pro V6.....	\$535
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AutoCAD LT 2000

The only low cost, professional 2D CAD program that's 100% AutoCAD compatible

New AutoCAD LT 2000 is the easiest, most efficient way for you to extend your design team-because it's simple enough for new-to-CAD users, accessible enough for occasional users, and powerful enough for professional-strength drafting. Plus it's the only low-cost, professional 2D CAD program to combine productivity-packed precision and award-winning HTML-based online help with unprecedented ease-of-use and 100 percent AutoCAD 2000 compatibility. So team members can exchange drawing files with confidence knowing that data integrity and visual fidelity are ensured. And they can take advantage of more than 200 new productivity features including Multiple Design Environment, AutoCAD DesignCenter, and the Object Property Manager.

AutoCAD LT 2000 is the perfect low-cost, 2D CAD tool for today's design environment. That's because there's usually an extended design team working on every project. From the architects and engineers to the drafters, consultants, and clients your entire team will communicate more easily, share data more accurately, and work more efficiently thanks to all of the professional-strength features of new AutoCAD LT 2000.

- Visual and Intuitive
- Drawing Productivity
- Compatibility and Design Sharing
- Learnability



Add-ons Available!
AUT111 Smart Architect Lt.....\$899
AUT112 Lt 3D.....\$269

WebSearch Code: AUT469



AUT469

\$789



AUT109 Student Copy.....\$249
AUT110 Faculty Copy.....\$699

GRAPHICS & CAD

Actrix Technical

The Simply Smarter Way to Diagram

Actrix Technical is a 2D diagramming tool that provides a truly automated drawing environment for easily creating a full range of dynamic drawings, from facilities plans to technical schematics to business diagrams.

Easy to Use

Just select the template that suits your task and browse the catalogues you're shown. Then drag and drop the ActiveShapes objects you need into your diagram or drawing. You can even directly manipulate them on-screen.

Superior AutoCAD Interoperability

Actrix Technical can read and write AutoCAD drawings, and it lets you reuse AutoCAD blocks in your diagrams.

Intelligent, Discipline-Specific, ActiveShapes

Drag intelligent ActiveShapes into place and they automatically snap, align, and rotate precisely into position. Handle-based, dynamic editing means you can reshape them on the fly. Thousands of ActiveShapes objects have been developed by industry experts and are included with Actrix Technical software.



AUT056

\$495

WebSearch Code: AUT056

Actrix Business

Better Visuals for Better Communication

Actrix Business is the easy-to-use, value-priced diagramming tool designed for business professionals who need to quickly create dynamic visuals like flowcharts, block diagrams, organization charts, and other business drawings. Get results faster with features like single-click drag-and-drop drawing, automatic snapping and alignment of shapes, and easy navigation using the familiar Microsoft Office interface. Get your point across faster with compelling visuals that can be easily dropped into Microsoft Word or Powerpoint documents, or shared on the Internet in HTML. Actrix Business is part of the Actrix family of Simply Smarter Diagramming tools from Autodesk, the world leader in PC-based design tools.



AUT470

\$179

WebSearch Code: AUT470

AutoSketch 6.0

Spend Time Drawing - Not Learning Software!

An affordable and easy-to-use precision drawing tool for new or occasional CAD users who need to create conceptual drawings and sketches. AutoSketch 6.0 provides productivity and ease of use features not found in other low cost precision drawing programs.

Other features include 3-D Effects to add more impact to conceptual drawings, proposals and presentations; customisable grids; in-place OLE editing and the ability to import/export DWG files. Compatible with Microsoft Windows 98, 95 and NT.

- Drawing Guides
- Automatic Snap
- Spell Check
- Dynamic Pan & Zoom
- AutoArray
- Detail View
- Construction Lines
- Advanced tools for easier wall placement
- Hyperlinks



QUI052

\$169

Upgrade
AUT025

\$115

WebSearch Code: QUI052

WebSearch Code: AUT025

QuickCAD

Faster, Easier, and Most Affordable CAD!

QuickCAD Millennium Edition is the faster, easier, most affordable CAD software, whether you're a first-time user or an expert. A three-level interface prompts you to choose your level of experience - Beginner, Advanced, or Expert - to easily create any technical drawing. Other features include QuickHatch, AutoArray, Jump Snap, Guidelines, Realtime Pan and Zoom and compatibility with most popular CAD programs. In addition, QuickCAD software's DWF export allows you to publish your drawings on the Web. QuickCAD Millennium Edition offers features and performance to allow you to become more productive even faster.



AUT040

\$75

WebSearch Code: AUT040



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PLEDGE**

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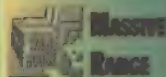
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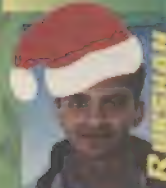
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**Terms &
Conditions**

All prices include Sales
Tax. Prices subject to
change, see page 46 for
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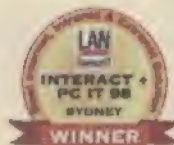
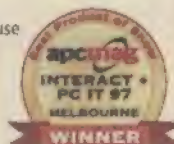
EXPRESS ORDERLINE 1300 300 003

INETstore Professional

Online Shops and Catalogue Builder

- INETStore's easy to use interface allows users to quickly create and maintain an online shop or catalogue.
- The Store Creation Wizard guides you through templates, allowing you to create your catalogue or shop in minutes.
- Allows users to build and maintain catalogues containing thousands of items.
- INETStore includes built-in basket and trolley facilities that are setup with templates. You can use these easily without the need for any complicated programming.
- INETStore gives you the ability to add sophisticated keyword and constraint search pages to your shops and catalogues.
- INETStore supports ODBC compliant databases such as Microsoft Access. Using the wizards in Microsoft Access customers can import and export data to and from INETStore from Microsoft Access, Excel and other ODBC compliant databases. (Microsoft Access should be purchased separately.)
- The Offline Maintenance module allows you to build and maintain your shop or catalogue at home or office and then upload to your ISP any time using the built-in send-to-server wizard.
- The Online Maintenance module allows you to maintain the shop with any web browser, including Netscape Navigator and Internet Explorer.

INETstore®
Online Shops and Catalog Builder



INETstore Enterprise

In addition to the features of INETStore Professional:

- Order Tracking module keeps your customers informed of the progress of their orders. Quickly determine whether orders are being assembled, tested, shipped, or are on back order.
- User Access Control allows you to create different user profiles for your wholesale and retail customers, and allows you to customise the shopping experience for different users.
- Supports the use of Microsoft SQL Server and Oracle database engines.
- Includes "script" based replicator utility which allows you to take advantage of your existing databases by importing certain text based file formats into your new online catalogue or shop.
- The Stored Cart module allows your end users to store their shopping carts for future use.

WebSearch Code: INT145
WebSearch Code: INT146



INETStore Professional
INT145
\$845

INETStore Enterprise
INT146
\$3595

MasterClips FloorPlan 3D Design Suite v5



Design and Visualize Your Home and Garden in Photo-Realistic 3D

New FloorPlan 3D is Packed with over a Hundred Easy-to-Use Design Tools and Top-Notch Technology!
Whether you're planning to build a new home, renovate your existing one, add a deck or landscape your entire lot, FloorPlan 3D Design Suite has everything you need to take your project from concept to reality.

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- Unlimited Building Levels
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- Intelligent Object Insertion
- Self Healing Walls
- Import/Export to CAD via DXF
- Integrated Internet Resources



IMS258

\$125

WebSearch Code: IMS258

MasterClips 1,250,000

IMSI

We've combined the vast and complete MasterClips Premium Collection on CD with ArtToday's expanding online image archive. The result: 1,250,000 - a new standard in clip art quality, convenience and selection. And with the included vector art editor, hundreds of thousands of image options are only the beginning! Online or right out of the box, awesome images from two of the art industry's favourite collections make your every project, presentation, publication, or Web page as stylistically unique as can be!

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- Key Word Searches
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Color Image Catalog



IMS256

\$185

WebSearch Code: IMS256

IMS257	IMSI MasterClips 3D Artist	\$69	MAC055	Macromedia Freehand 8	\$785
IMS151	IMSI MasterClips 1,000,001	\$189	MAC102	Macromedia Freehand 8 (Mac)	\$789
IMS106	IMSI MasterClips 500,000+	\$139	MAC123	DreamTeam & Freehand 8 Educational	\$399
IMS134	IMSI MasterClips Web Art	\$89	MAC127	Macromedia Fireworks 2 (Mac)	\$349
MSS236	MS FrontPage 2000	\$169	MAC128	Macromedia Flash 4 (Mac)	\$535
MSS245	MS FrontPage 2000 Upgrade	\$85	ADO186	Adobe Go Live (PC)	\$529
NET155	Net Objects Fusion 4.0	\$535	ADO037	Adobe Go Live (Mac)	\$529
ADO112	Adobe Pagemill 3.0 (PC)	\$149	MGF026	Micrografx iGrafX Business	\$165



Web Design Studio

A Complete Integrated Solution for Professional Web Designers

Macromedia's Web Design Studio offer provides Web designers and developers with the premier package of tools for creating the basic building blocks of interactive web sites: graphics, vector animation & sound, and code. With Dreamweaver, Fireworks, and Flash, you can visually create interactive Web sites that load fast and work great across different computer platforms and web browsers.

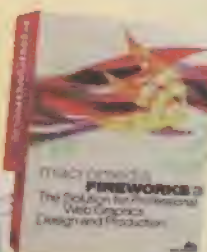
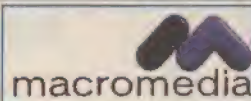
Web Design Studio includes everything you need to design and produce professional web sites.

- Dreamweaver is the solution for professional Web site design and production. It is the only tool to offer Roundtrip HTML between visual and source editing. Dreamweaver 3 takes productivity to a higher level with advanced table editing, deluxe site management tools, Dream Templates, and extensibility beyond your wildest dreams.
- Fireworks can be used to create feature graphics, buttons, animated banners and JavaScript rollovers to be included in a Dreamweaver HTML document. Optimize and slice your graphics before flowing them seamlessly into Dreamweaver.
- Flash is the standard for interactive vector graphics and animation for the Web. Web designers use Flash to create beautiful, resizable, and extremely compact navigation interfaces, technical illustrations, long-form animations, and other dazzling effects for their site. Graphics and animation will anti-alias and scale based on the viewer's screen size, providing high-quality viewing.

Includes:

- Macromedia Dreamweaver 3 • Macromedia Fireworks 3 • Macromedia Flash 4

WebSearch Code: MAC090



MAC090
\$919

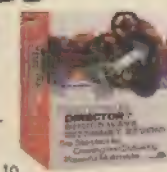
GRAPHICS & WEB DESIGN

Director 7 Shockwave Internet Studio

(including Fireworks 2)

Director unleashes your creativity with the only tools powerful enough to combine graphics, sounds, animation, text and video into compelling content that grabs your audience and delivers your message.

- Deliver applications and presentations quickly through easy-to-use visual metaphors
- Multiuser Server to build shared Web experiences and multi-player games



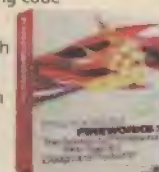
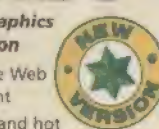
MAC112
\$1719

WebSearch Code: MAC112

Fireworks 3

Professional Web Graphics Design and Production

- Design fully editable Web graphics in an instant
- Easily add rollovers and hot spots, without writing code
- Save hours of production time with enhanced features
- Seamless integration with popular HTML editors and graphic tools
- Everything is JavaScriptable, so you can automate repetitive tasks



MAC132
\$329

Upgrade
MAC133
\$239

WebSearch Code: MAC132
WebSearch Code: MAC133

Flash 4

Produce High-Impact, Vector-Based Web Sites

- Deliver high-impact Flash sites by mixing and Synchronising MP3 streaming audio with interactive buttons and animation.
- Create distinctive user interfaces, site navigation and other Web applications without programming.
- Produce animated designs more efficiently than before with the optimised Timeline, smart motion guides and outline color mode.



MAC120
\$525

WebSearch Code: MAC120

Dreamweaver 3

Professional Web Site Design and Production

- Build cross-browser Web sites and maintain complete control over HTML
- Maximise productivity and streamline workflow between team members and between applications
- Extends to integrate with other Web applications
- Achieve complicated programming in a few simple steps



MAC134
\$489

Upgrade
MAC135
\$249

WebSearch Code: MAC134
WebSearch Code: MAC135

iGrafX DESIGNER

iGrafX Designer is the only complete toolset for technical and web graphics, with micron-accurate scale drawing and creative tools, and imaging graphics for publishing and the Web.

Features & Benefits

- Comprehensive annotation - annotate files with associative dimension lines, angular and radial dimensions, area, volume and perimeter along with call outs.
- Transparent vector effects - make colours, gradients or bitmap and tiled fills transparent or gradually transparent.
- Output Interactive iGrafX Designer files as Interactive JAVA applets for use with any web browser.
- View, name and manage objects and layers with the object and layer browser.
- Line styles for any type of technical illustration or fashion design.



PRICE DROP
15% OFF

MGF027
\$585

WebSearch Code: MGF027

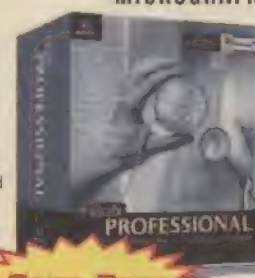
iGrafX PROFESSIONAL

Create Professional-Quality Business Diagrams... Your Way!

To make an impact and get your point across you need to communicate ideas, information and data using clear, instantly understandable visuals that give you and your company an edge. Create flowcharts, process maps, network diagrams and organisation charts faster and easier than ever before.

Features & Benefits

- Automatic offpage connectors - makes multi-page printed diagrams easier to read. When published as HTML, connectors become hyperlinks.
- Web Links - All documents and web pages can be linked.
- Includes iGrafX Business.
- Multiple fonts, interline spacing, paragraphs and bullets within shapes - Create attractive, stylish charts that accurately reflect the information being communicated.
- Import diagrams created with Visio.



PRICE DROP
13% OFF

MGF025
\$585

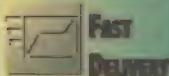
WebSearch Code: MGF025



**PRICE
PLEDGE**
We will not be
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We cut prices not
corners.



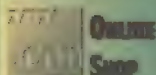
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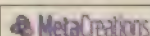
Ray Dream Studio 5.5

The Essential Tool for 3D Design
and Animation

Ray Dream Studio's best-of-class feature set, compatibility, value, ease-of-use, and performance make it the clear choice for every graphic artist, web designer, and multimedia producer. Special effects such as realistic depth-of-field, visible lights and lens flares, along with newcomers like fire, skies and motion blur, mean you can produce high-end, Hollywood-style output right from your desktop.



WebSearch Code: MET039



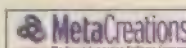
MET039
\$585

Painter 6

The world's indisputable leader for
image creation

MetaCreations Painter 6 is the best version yet of the ultimate painting tool for graphic designers and fine artists alike.

- Exclusive tool set offers an extensive array of brushes, textures, canvas choices, and art materials
- Faithfully capture the subtleties of an artist's style for high-quality output for print and the Web
- Create your finest work using the next generation brush engine technology



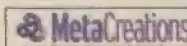
WebSearch Code: MET038

MET038
\$729

Bryce 4

Bryce 4 is dedicated to designing, rendering and animating breathtaking natural 3D worlds and abstract 3D sculptures.

- Textured terrain export through real-time multi-resolution Export Lab
- Interactive movie previewing system
- Create stunning skies with the tools available in the Sky Lab
- Use Bryce to build content for the Web, using a variety of authoring tools



WebSearch Code: MET032

MET032
\$455

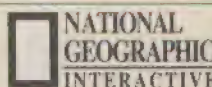


Upgrades

MET040	Poser 4 Upgrade (Dual Platform)	\$239
MET041	Ray Dream Studio 5.5 Upgrade (Dual Platform)	\$209
MET042	Painter 6 Upgrade (Mac)	\$325
MET043	Painter 6 Upgrade (Win)	\$325
MET033	Bryce 4 Upgrade (Dual Platform)	\$225

For full information on our MetaCreations products, check out our website at www.iswh.com.au

National Geographic Maps



This unprecedented CD-ROM archive includes every fold-out map ever published by National Geographic magazine, plus engaging multimedia map tours, an interactive timeline that traces the evolution of mapping, key events in National Geographic cartography and the fascinating stories behind these very special maps.

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- View, plan and zoom in on selected maps at diverse levels
- Print each spectacular full-scale map or map section in glorious colour
- Copy and paste maps into other documents



SCHOLASTIC

WebSearch Code: SCH005

SCH005

\$89

The Complete National Geographic



108 Years of National Geographic on CD-ROM

An indispensable resource for every home and school library, The Complete National Geographic includes all of National Geographic magazine's award-winning photographs, stories, maps* and charts, plus period advertising from the past century.

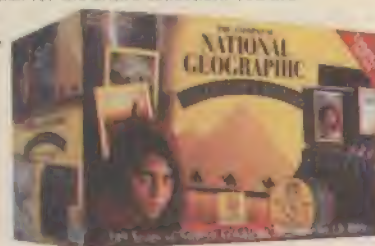
Finding specific articles, features or advertisements is easy with The Complete National Geographic's powerful search engine. You can quickly browse more than 175,000 pages of text and 1,200 magazine covers, locating specific articles by date, issue, topic, or title.

Each CD includes the search index for the entire collection. You are automatically pointed to the correct location of each article, feature or advertisement. It even references the printed issue, by month and page numbers!

Selected pages can be printed out, in colour or black-and-white, and articles can be bookmarked and returned to at a later date.

Features

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- Entire search index on all CDs
- 178,567 spectacular images
- 9,048 fascinating articles
- 100 years of classic advertisements
- Over 175,000 pages of engaging text
- National Geographic's integrity and quality in a new digital medium



SCHOLASTIC

WebSearch Code: SCH001

* supplement
maps not
included

SCH001

\$199



OmniPage Pro 10 Upgrade

What's New in OmniPage Pro 10?

New OCR Engine - combines the OCR technologies from three award-winning OCR applications: OmniPage Pro, WordScan Plus and Recognita Plus. It's like having three pairs of eyes checking each page at once to dramatically improve accuracy. The result? Less editing. Less proofing. Less work. It's accuracy you really have to see to believe. Also, OmniPage Pro 10 incorporates additional dictionaries that increase accuracy recognition, especially on compound and non-English words. As a result, the program provides the highest level of OCR accuracy and reduces the number of errors by 30%, on average, over the previous version.

Voice Read-Back - reads OCR results back to users out loud.

OmniPage Web Personal Edition included - Caere's pioneering Web publishing software that converts multi-page documents to well-designed, fully hyper-linked Web sites.

New Simplified User Interface - a streamlined user interface makes the OCR process more intuitive and straightforward by providing a new tabbed toolbox, which allow users to select from three process modes: AutoOCR, Manual or OCR Wizard, each with their own toolbars.

Improved Font Rendering - new Font Matching scheme takes into account font metrics such as character aspect ratio, as well as the look of characters and the spacing of text lines.

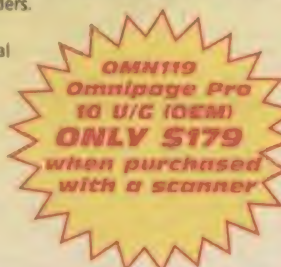
Improved De-skew Technology - minimises distortion of the document image which often occurs during the page straightening process, thereby improving OCR accuracy. This is particularly helpful for users with sheet-fed scanners and those using automatic document feeders.

New Caere Scan Troubleshooter - assists users in resolving common scanning problems.

Improved OCR Proofreader - now includes five levels of zoom that enable users to see as much of the original document as necessary to proof OCR results.

Auto-launch of Native Applications - users can automatically launch the applications to which their documents are being exported, including Microsoft Word and Excel.

Microsoft Windows 2000 Certified - OmniPage Pro 10 is among the first software applications to meet Microsoft's requirements for Windows 2000 certification.



OmniPage 10 U/G
(Upgrade from ANY
OCR Software)
OMN120
\$199

WebSearch Code: OMN120

GRAPHICS & OCR

PageKeeper Pro 3.0

The Best Document Manager

PageKeeper Pro 3.0 is the only document manager to fully automate the time-consuming tasks of organizing and maintaining all your documents. Need a document fast? PageKeeper Pro works like a search engine and instantly finds all documents that meet your criteria.

Features:

- Automatically files documents with Smart Folders
- Automatically keeps track of edits
- Instantly finds any document
- Supports any file format
- Manages Web pages



OMN116
\$99

WebSearch Code: OMN116

OmniPage Pro Scanner Suite Upgrade

Everything you need for your scanner

Includes

- OmniPage Pro 9
- PageKeeper Pro 3.0
- Adobe PhotoDeluxe Business Edition
- Post-it Software Notes

More Accurate OCR

- Over 99% accurate*
- Ability to maintain layout of original page
- Superior integration with Microsoft Word

Automatic File & Find

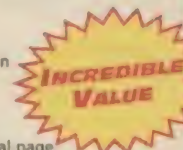
- Automatic document organisation with Smart Folder
- Automatic document importing with Folder Watch

Better Image Editing

- Hundreds of business templates for Web banners, direct mail and more
- Ability to print to Avery paper for labels, business cards and more

The Top Annotation Software

- You can add notes to scanned images, other documents and even put them on the desktop



Upgrade
OMN117
\$255

WebSearch Code: OMN117

* On laser quality documents using standard fonts

OmniForm 4.0

Electronic Forms the Easy Way - Instantly!

Take any paper form, scan it with OmniForm, and wow! You've got an electronic form that you can fill out right on your computer screen! But that's only the beginning of the amazing versatility of your electronic form. You can store it for re-use, print it whenever you want, e-mail it, keep its data in a database - electronic forms are just plain better than the old-fashioned paper kind. And OmniForm is the easiest, best way to scan or create electronic forms.



OMN115
\$259

WebSearch Code: OMN115

OmniPage Web

OmniPage Web is the fastest, easiest way to convert multipage paper documents into working Web sites. Using the award-winning OmniPage Pro OCR engine and the revolutionary new Logical Structure Recognition, (LSR) technology, OmniPage Web outlines your scanned document and creates a complete, dynamic Web site with separate Web pages for each page, chapter or section. OmniPage Web automatically cross-links references and even creates a hyperlinked table of contents and navigation tools! Preview your site in your favourite HTML browser or editor, then publish it to the Web - OmniPage Web makes the process of going from paper to the Web faster and easier than you ever thought possible.



OMN019
\$709

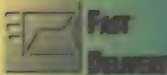
WebSearch Code: OMN019



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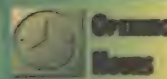
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EXPRESS ORDERLINE 1300 300 003

CD Phone Directory

Access to Over 8 Million Business & Residential Listings Australia Wide
Imagine how much easier and faster it would be if you had virtually every Australian business & residential telephone number on your own PC! Now includes Mobile Numbers, International Codes, Fax Numbers, as well as:

- Gives instant access to over 8,000,000 business and residential listings across Australia!
- Search by Company Name, Line of Business, Surname & Initial, Suburb, State & Postcode!
- BONUS Save \$\$ on 013 charges

WebSearch Code: DTM011



DTM011
\$19

Phonedisc

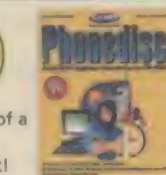
With Search by Phone Number!

A powerful tool for finding what you want and who you want in seconds! Imagine the advantages of a telephone directory that not only gives you much more information, but also gives it to you the way you want it!

Features:

- Search by Company Name, Surname, Suburb, State, Postcode or line of Business
- Includes fax number, mobile and government departments
- "Sounds-like" facility
- Allows printing and exporting of one record at a time
- Auto dialer facility
- Ideal product for cross referencing your phone bills and tracking debtors

WebSearch Code: DTM001



DTM001
\$89

Wasting too much time on the road? Get LapLink Professional and get productive

LapLink Pro lets you work whenever and wherever it's convenient for you. When you need to share information between an office PC, a laptop, or your home PC while travelling or working away from the office, LapLink Pro will get you connected.

LapLink Pro sets the standard in usability and is the #1 rated choice for easy, speedy and reliable remote control and file transfer by mobile professionals and telecommuters.

- Single mode operation - no need to set "guest" or "host" modes
- Includes bonus Windows CE remote control software
- Adaptive compression automatically gives optimal speed over all connections
- Optimised for Windows 98
- Compatible with Windows 3.1, 95, 98, and NT
- Supports USB cable for faster file transfer
- Smart install configures all devices automatically - no user intervention required
- Integrated scheduler for Windows 98, 95, NT
- Print redirection from remote PC to local printer, or to a remote PC's printer

WebSearch Code: LAP011



LAP011
\$169

Lotus Notes

What is Notes R5? Lotus Notes R5 is state-of-the-art e-mail, calendaring, group scheduling, Web access and information management — all integrated in an easy-to-use and customizable environment.

Key Benefits include:

Ease of Use Notes makes it easy to find, sort and manage all your work. Automated wizards and preset configurations make installation and e-mail setup easy too.

More than Mail Notes integrates your e-mail, calendar, address book, to-do list, and the Web — and streamlines daily information management. What You Need, When You Need It. A customizable Welcome Page summarizes your most important information in one display. Use the Bookmark Bar to create quick links to frequently needed information.

Lets You Work Anywhere Notes synchronizes data with your laptop and personal digital assistant (PDA) so you can take e-mail, appointments, to-dos, contacts and more on the road.

To find out what Lotus Notes R5 can do for your business, visit our website at www.iswh.com.au or call our team on 1 300 300 003.



WebSearch Code: LOT528

LOT528
\$125

Laplink Tech

Put the ultimate support and setup tools to work for you

LapLink Tech provides the tools you need to remotely support customers, set up and upgrade PCs quickly and defend against viruses - all in one complete solution. No matter where your customers are or where you work, LapLink Tech offers you the flexibility to support your customers whenever they need it. LapLink Tech is designed for Windows 95 and NT 4.0, and is completely compatible with Windows 98. It also works with any earlier version of LapLink for Windows or Remote DeskLink.

Its Remote Control and File Transfer capabilities mean you won't have to leave your desk to work with remote users. Disk cloning speeds system installation and upgrade tasks, while virus protection defends your system. Plus our industry-leading useability makes sure you gain benefits right away. Laplink offers all the key tools to make remote support and system setup a snap.

Features:

- Remote Control
- Simultaneous Voice Chat
- File Transfer
- Automated File Synchronization
- Print Redirection
- Security
- Cross-platform compatibility
- Disk Cloning
- Virus Protection - WinGuard

WebSearch Code: LAP009



LAP009
\$259

MSS569	MS Access 2000	\$535
MSS257	MS Access 2000 Upgrade	\$169
LOT015	Lotus Organizer 5.0	\$99
LOT002	Lotus Notes Desktop	\$149
TRA006	Tracker Maximiser 5.0	\$209
DDD001	Australia on Disc Business	\$329
DDD002	Australia on Disc Residential	\$329
DDD003	Australia on Disc Business & Residential	\$529

USR008	3Com Palm IIIx	\$599
USR007	3Com Palm V	\$119
NOR084	Norton Mobile Essentials	\$125
RMG212	SideKick 98	\$79
PRO529	ProComm Plus 32 4.7	\$249
ART058	Modem Share 32 - 1 Port	\$209
MSS161	Microsoft Exchange 5.5 & 5 Clients	\$1529
DTM002	DTMS Fax Pro	\$275



pcAnywhere 9.0 SYMANTEC.

The #1 seller for fast, easy access to any PC

If you need to work from home or on the road, pcAnywhere lets you connect to your office PC to transfer files quickly and easily. Its special optimised design ensures the best possible performance at any connection speed. You can also run applications that reside on your office PC or a corporate server - a great feature for software that's too large to keep on your laptop or that can't be installed on external computers for security reasons. pcAnywhere supports a wide range of connection methods - including standard modems, ISDN lines, TCP/IP and IPX/SPX networks, direct cable, and infrared connection-so wherever you are, you're sure to find one that meets your needs. And now, it's even easier to use over the Internet.

If you're an IT professional, pcAnywhere lets you remotely support users and manage servers effectively. Monitor and control remote laptop and desktop systems to troubleshoot problems. Deliver training materials and pre-configured software updates to multiple users. Manage LANs, WANs, and even enterprise-wide information systems.

Version 9.0 features an enhanced file transfer interface, powerful centralised management and control, greater security, and LDAP directory services. And you can access all pcAnywhere functions through one clean, consistent interface.

SYM214

\$209

WebSearch Code: SYM214



COMMUNICATION

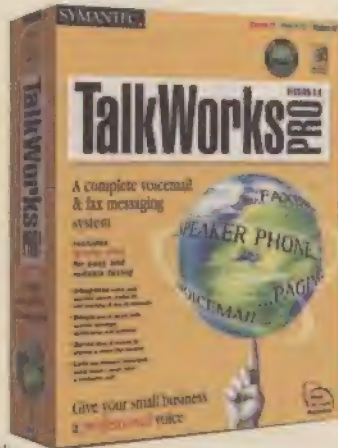
TalkWorks PRO 3.0

Give Your Small Business a Professional Voice

TalkWorks PRO from Symantec brings professional voicemail and fax messaging to home offices and very small businesses. Its integrated capabilities keep you in touch with your customers 24 hours a day.

With TalkWorks Pro 3.0

- Enjoy the full functionality of WinFax PRO.
- Get notification when a voicemail or fax message arrives.
- Create reports of incoming and outgoing calls.
- Save money by sharing a single voice modem and phone line across your entire business.
- Offer fax on demand to provide your customers with information any time of the day or night.
- Set up separate mailboxes for employees and fax on demand.



All these powerful features are accessible through an easy-to-use interface. There's even a mailbox setup wizard to get you up and running quickly. So if you need voicemail, message notification, call tracking, or fax on demand, give your small business a professional voice with TalkWorks PRO.

SYM224

\$169

WebSearch Code: SYM224

SYMANTEC.

ACT! 2000

Complete Customer & Calendar Management

ACT! 2000 from Symantec is the award-winning leader in contact management software. It gives you instant access to detailed contact and account information, plus a complete history of your contact-related communications and help with managing your schedule efficiently.

Features

- Powerfully manage activities for entire accounts as well as individuals.
- Keep comprehensive, customisable contact information.
- Store notes from meetings and phone calls.
- Stay productive while on the road with Palm Pilot Link software (included).
- Utilise other email, fax, word processing, expense tracking, and business applications with ACT! 2000's seamless integration.
- Put the Internet to work for you with built-in Internet links.
- New "sales funnel" graphs help you manage your sales process more effectively.



ACT! 2000 even includes expert assistance from Dale Carnegie Training to help you turn contacts into sales. So get ACT! and get results!

SYM223

\$159

WebSearch Code: SYM223

SYMANTEC.

WinFax Pro 9.0

The world's #1 choice for hassle-free faxing!

WinFax PRO 9.0 software takes Symantec's industry-leading fax solution to new levels of flexibility, reliability, and ease of use.

With WinFax PRO 9.0

- Small businesses can look more professional by sending crisp laser-quality faxes.
- Workgroups can save money by sharing a fax modem and phone line through a non-designated fax host.
- It can also notify mobile users via pager or PCS cell phone as soon as an important fax arrives, or automatically forward faxes to another fax number or an e-mail address.

WinFax Pro 9.0
SYM191

\$125

WebSearch Code: SYM191

WebSearch Code: SYM218

SYMANTEC.



Mobile WINFAX for the palm-computing Platform.

The worlds leading fax software is now available for the Palm Pilot.

Mobile WinFax
SYM218

\$75



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**FREE
GIFT**

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for your free gift
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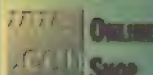
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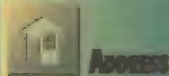
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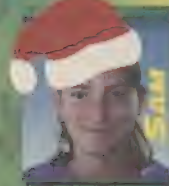
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terms and conditions.



EXPRESS ORDERLINE 1300 300 003

WinZip 7.0 The Ultimate Companion for Internet Downloading

WinZip brings you the convenience of Windows to the use of ZIP files without requiring PKZIP and PKUNZIP. It features an intuitive point-and-click drag-and-drop interface for viewing, running, extracting, adding, deleting, and testing files ZIP, LZH, ARJ, and ARC files.

The Zip Advantage:

Zipping safely compresses the data in your files, so that your files occupy less space. This allows you to save more time by speeding up file transfers. "Zippping" reduces the size of files, while "Unzipping" restores the files to their original form, completely unchanged.

Internet Surfers:

WinZip makes it easy for you to access almost all of the compressed files you download from the Internet. WinZip features built-in support for Zip, TAR, gzip, Unix Compress, UUENCODE, BinHex, and MIME files.

Key Features

- Tight integration with the Windows 95/98/NT shell
- Drag & Drop to or from the explorer, or ZIP & UNZIP without leaving the Explorer
- Drop files on a printer to print
- With the easy to use tool bar you have the convenience of Windows when Zippping
- Built-in PKZIP-compatible ZIP and UNZIP (PKZIP and PKUNZIP are not required)
- Built-in support for the popular Internet file format TAR, gzip, Unix

compress, Uuencode, Xxencoder, HinHex, and MIME

- Simplify file distribution by making files that unzip themselves
- Optional WinZip Wizard interface
- Works with ARJ, ARC, and LZH files
- Optional virus scanning support
- Supports Windows 3.1, 95, and NT
- 32 and 16 Bit versions Included



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AVAILABLE**

WIN119
\$65

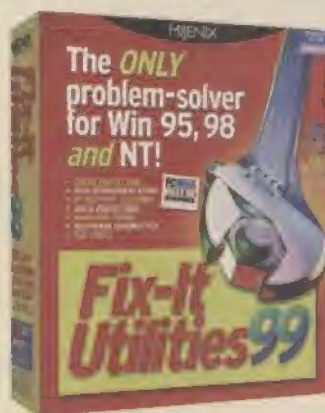
WebSearch Code: WIN119

Fix-It Utilities 99

New from Mijenix, the makers of ZipMagic, FreeSpace and PowerDesk comes a brilliant new product to keep your PC in tip-top condition. Fix-It includes a myriad of utilities that check, clean, protect and secure your PC (Win 95/98 and Win NT).

Fix-It Utilities includes:

- Crash Protection
- Disk Fixer
- Disk Defragmentation
- Smarter Drive Optimising
- Clean & Optimise the Registry
- Hardware Diagnostics
- Bring back trashed files
- Virus Protection
- Year 2000 Tools
- Win 95, 98 & NT
- Emergency Disk Included!
- PowerDesk, valued at \$59.95 bundled FREE
- From Mijenix the makers of ZipMagic
- Winner PC Week Best of Comdex Award
- Head to Head winner against Nuts & Bolts & Norton Utilities



Fix-It Utilities 99 includes just about everything that you could need.. and it sells for under \$100! Even if you have Norton's Utilities you will immediately see the additional benefits you get from Fix-It Utilities 99.

MJ001
\$85

WebSearch Code: MJ001

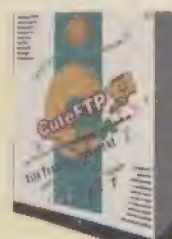
CuteFTP

For Uploading Web Pages ...Fast!

CuteFTP is a Windows-based File Transfer Protocol (FTP) client that allows users to utilise the capabilities of FTP without having to know all the details of the protocol itself. This excellent FTP program has a lot more than just a pretty interface.

Key Features

- Drag and Drop Interface.
- Fast Upload and Download.
- Resume Upload and Download.
- Remote File Editing.
- Queue Transferring
- Bookmarks Remote Directories.
- Clipboard Monitoring of FTP links.
- Force Upper/Lower/Preserve File Case.
- CuteFTP has an excellent array of features, including caching, stop command and cool interface. It is a must have upgrade that's definitely worth the download
- CuteFTP version 2.0 is specially designed to take advantage of the Microsoft Windows NT and Windows 98 operating systems. Microsoft, Windows, the Windows logo, and Windows NT are registered trademarks of the Microsoft Corporation.
- Keep Alive "Noop" Command.
- Integrated HTML Editor.
- Powerful Macros that Work.
- Directory Compare for Web Site Maintenance.



GBS001
\$79

WebSearch Code: GBS001

VET Premium Anti-Virus

Virus Protection For All Platforms

Essential Protection

Virus protection has never been as essential as it is today. New viruses are continuing to appear at an ever-increasing rate and new types of viruses - for instance Word macro viruses - regularly take the PC World by surprise. The Internet, intranets, networks, Email, shared disks and shared PCs all enable viruses to spread. Vet Anti-Virus Software provides you with the protection you need for your system, whether it is a stand-alone PC or a complex network of PCs in an organisation.

This combines all the advantages of Vet Net Surfer with the additional benefit of mailed quarterly upgrades - delivered to your home or office. The choice is yours - Vet Net Surfer with on-line upgrades, or Vet Premium with on-line and mailed upgrades. Both offer complete virus protection for you PC.

- Unlimited phone and email support
- Unlimited access to upgrades on-line
- Upgrades mailed quarterly direct to you



Vet Premium
VET007
\$89

Vet Net Surfer
(updates via Internet only)
VET006
\$75

WebSearch Code: VET007
WebSearch Code: VET006

WIN109	PKZip 2.6	\$59
ADA066	Adaptec Toast (Mac)	\$139
MAC130	Mac Opener 2000	\$145
STU002	Stuffit Deluxe (Mac)	\$109
SOL075	Dr Solomon's Virex (Mac)	\$69
QUA146	CleanSweep Extra-Strength	\$85
CON031	Conversions Plus 4.5	\$259
QUI050	PaperClip	\$29

ADA070	Adaptec EZ SCSI 5.0	\$135
POW006	Powerchute for Win NT	\$129
SOL011	McAfee Dr Solomons Std	\$69
SOL041	McAfee Dr Solomons	\$89
MAN120	Turbo Browser	\$85
ROB002	Robo Help Office 7.0	\$1445
VET010	Vet Enterprise 2-PCs	\$159
VET012	Vet Enterprise 10-PCs	\$399



Norton SystemWorks 2000 Professional Edition

Norton SystemWorks 2000 Professional Edition combines the world's #1 utility suite with advanced tools for PC experts. Fix and prevent windows problems, find year 2000 bugs, and clone entire systems - all for one great price. Don't take chances with your PC. Keep it working with Norton SystemWorks 2000 Professional Edition.

An incredible value, offering five award-winning products, plus advanced utilities, Norton 2000 and Norton Ghost for PC experts. Also included in SystemWorks 2000 Professional Edition is a free Bonus Pack.

Includes Professional Pack:

- Norton 2000
- Norton Ghost

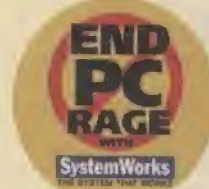
Plus Bonus Pack:

- Zip It (File Extraction & Compression)
- WinFax Basic Edition (PC Faxing)
- Norton Secret Stuff (Internet Email Privacy)
- Visual Page (Web Development Tool for building and managing web pages)

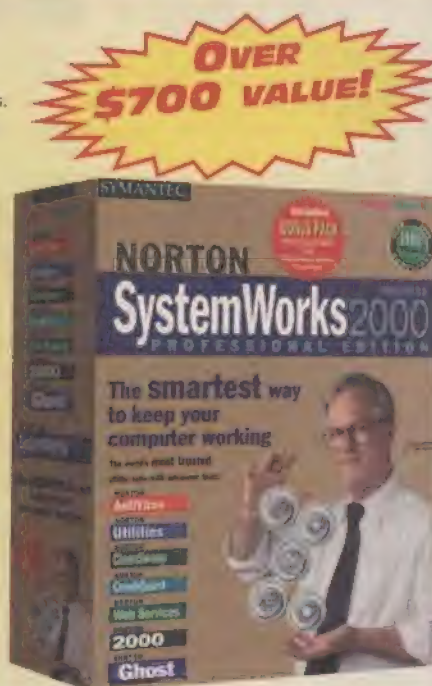
* Pay \$149 & receive \$50 cashback Offer ends 31 December '99. Call for full details.

Everything you need in one fully integrated suite:

- Norton AntiVirus 2000
- Norton Utilities 2000
- Norton CleanSweep 2000
- Norton CrashGuard 2000
- Norton Web Services



NOR110
AMAZING!
ONLY
\$99*



UTILITIES

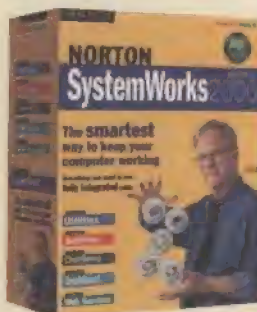
Norton Systemworks 2000 Standard Edition

Norton SystemWorks 2000 for Windows 98/95 is the only fully-integrated and market-leading utility suite designed to protect your computer from viruses and crashes, solve problems, remove unneeded files, and update your applications.

Includes:

- Norton AntiVirus 2000
- Norton Utilities 2000
- Norton CleanSweep 2000
- Norton CrashGuard 2000
- Norton Web Services

OVER
\$300
VALUE!



NOR109
AMAZING!
ONLY
\$99*

* Pay \$129 & receive \$30 cashback Offer ends 31 December '99. Call for full details.

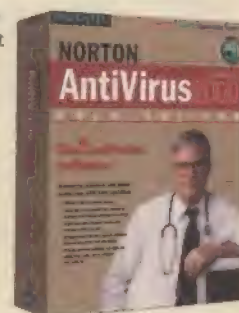
Norton AntiVirus 2000

The #1 Anti-Virus Software in the world

As always, Norton AntiVirus 2000 will run constantly in the background to keep your computer safe from viruses and it can be scheduled to automatically retrieve new antivirus definitions from Symantec as often as once a week.

Features:

- **Graphical Alerts** - New! Provides clear, easy-to-understand instructions on how to proceed when a virus is detected.
- **Email Scanning** - New! Scans incoming email attachments automatically for the most popular email products, preventing viruses from even entering your system.
- **Compressed File Detection and Repair** - Improved! Eliminates viruses hidden in multiple compressed layers automatically.
- **Ease-of-Use** - Improved! Provides increased integration with Norton SystemWorks.



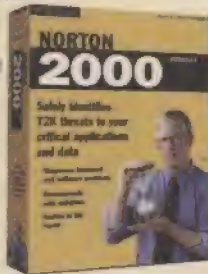
* Pay \$79 and receive \$20 cashback. Offer ends 31 December '99 Call for full details.

NOR113
\$59*

Norton 2000 v2.0

Safely identifies Y2K threats to your critical applications and data.

- Diagnosis hardware and software problems
- Recommends safe solutions
- Assist in file repair

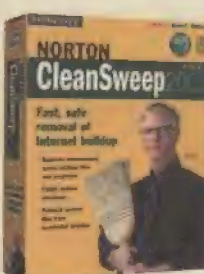


NOR114
\$45

WebSearch Code: NOR114

Norton Cleansweep 2000

Improve your PC's performance by easily removing un-needed programs and files. Provides automatic protection against accidental file deletion - no other clean up product is as safe.

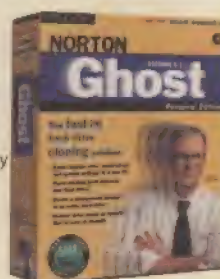


NOR111
\$59

WebSearch Code: NOR111

Norton Ghost Personal Edition

A powerful disk drive cloning and imaging utility that speeds up and simplifies PC system migration, hardware upgrades, hard disk backups and disaster recovery operations.

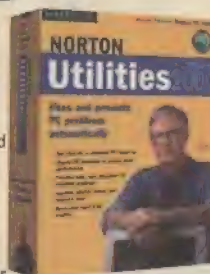


NOR106
\$119

WebSearch Code: NOR106

Norton Utilities 2000

Norton Utilities 2000 is the market leading solution for fixing, maintaining and optimising PC's.



* Pay \$79 & receive \$20 cashback offer ends 31 December '99. Call for full details

NOR112
\$59*

WebSearch Code: NOR112



**PRICE
PLEDGE**

We will not be
beaten on price!
We cut prices not
corners.



**FREE
GIFT**

Make sure to ask
for your free gift
when ordering.

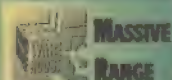


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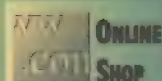
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- Next day*
- International*

*where applicable



**MASSIVE
RANGE**

We aim to stock at
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the items we sell



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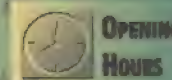
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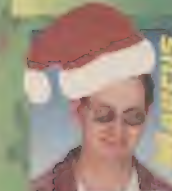
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Monday to Friday

10.00am - 3.00 pm (EST)
Saturday



**TERMS &
CONDITIONS**

All prices include Sales
Tax. Prices subject to
change, see page 46 for
terms and conditions.



EXPRESS ORDERLINE 1300 300 003

Snappy Deluxe

Get thousands of pictures from any source! Any thing your camcorder can see, any image on your VCR, any scene on TV and any action shot from your Nintendo, Sega, or Playstation can now be seen as a stunning high resolution picture on your PC.

Snappy Deluxe is the award winning, best selling video add on of all time. Just plug the module into your PC or laptop parallel port. Then connect your camcorder, VCR etc with the included cable. Watch your screen, and when you see a picture that you want, just click SNAP. Its that simple! Perfect for a thousand and one uses, such as desktop publishing, presentations, web pictures, PC photo albums, school projects or simply for having fun. You won't believe your eyes!

And Snappy Deluxe now allows you to record colour mini-movies with sound, and save them as AVI files (up to 2 frames per second).

The Most Award-Winning PC Video Product in History

Award-Winning Software Package Includes:

- Adobe Photo Deluxe 2.0 - Paint, title, and retouch images. Make professional newsletters, customise greeting cards, and much more!
- Gryphon Morph 2.5 - Hollywood's morphing magic, right on your PC! Morph your brother into your dog or your friends into TV stars!
- Kal's Power Goo SE - Turn your friends and family into hilarious animated cartoons and caricatures.

WebSearch Code: **PLAY03**

BeeLine

BeeLine is an award-winning global automated search program that quickly gathers Internet results from the most popular web-based search engines to deliver complete and fast answers to search requests. BeeLine understands plain

English requests.

- Find Information on the Web!
- Read the Latest News!
- Locate Email Addresses!
- Download the Latest Software!
- Save and export searches!
- Turn banner advertising off!
- Keep track of Articles posted in Newsgroups!
- A spellchecker and a thesaurus are included to help you refine your search. Search queries and results are automatically saved allowing you to browse them offline or use them again at a later stage.

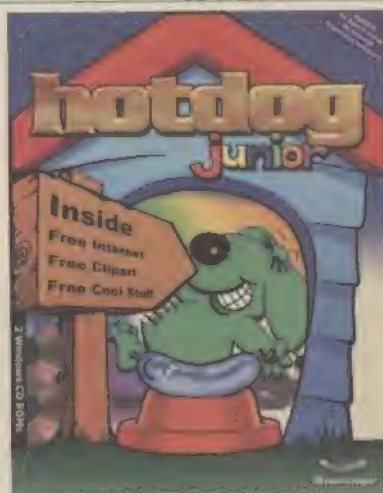
WebSearch Code: **BEE001**

HotDog Junior

Let your kids create their own home on the Internet! HotDog Junior is a simple and fun software program for making Web Pages, designed especially for children aged 6 and up. In four basic steps HotDog Junior allows kids to quickly create and design their own Web Pages, and then publish them to the Internet.

Absolutely no experience is necessary! HotDog Junior leads you through each step. You can have a Web Page on the Internet in just five minutes. Also includes 50,000 free Clipart Images and 50 hrs free Internet Access.

WebSearch Code: **SAU001**

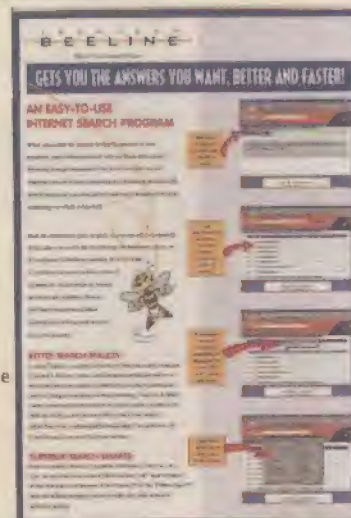


SAU001
\$65



PLAY03
\$419

- Search over 40 search engines simultaneously!
- BeeLine includes a powerful Auto-Update feature which checks if the search module is up to date. As Internet search technology evolves and new search engines become available, software updates will be made available on a regular basis which will update the BeeLine search module automatically with one simple click. Your copy of BeeLine will never be outdated!



BEE001
\$55

Amorphium

Now anyone can create amazing 3D graphics! Amorphium lets everyone from school kids to graphic artists, from web designers to Hollywood animator, make stunning 3D graphics. Amorphium is easy to use, but it's also incredibly powerful, made by the same people who created the 3D technology for movies such as Terminator 2, Titanic and Star Wars Special Edition.

Create - mould 3D Images as if you were moulding clay. Push, pull, twist and tweak all in real time.

Animate - powerful animation tools lets your creations jump, bounce and wiggle. Save your animations as movies or GIF files for the web.

Paint - add colours straight onto 3D shapes. Create textures, add shine, move lights, create shadows. Its easy with Amorphium.

Compose - Combine objects, pick backgrounds, even add fog and smoke to your scene. Then save it all in any standard file format (BMP, JPG, TIFF, GIF and many more).

Whether its for a presentation, web site or just for fun, Amorphium lets you create 3D graphics quickly and easily. (32MB RAM required).



WebSearch Code: **PLAY02**

PLAY02
\$389



PartitionMagic 5.0

Now the top-selling utility, that allows you to reclaim up to 40% of your hard disk & organise your hard drive, has got even better! PartitionMagic 5.0's new features makes it easy to eliminate inefficient storage methods that can cost you hundreds of megabytes of lost disk space.

New Features:

Merge Partitions - Users now have the ability to merge FAT and FAT32 partitions. This eliminates the need for copying your data to a separate partition prior to creating, moving, or resizing another partition. Merging partitions also eliminates time and steps because it speeds up the process of organising your data.

Partition Conversions - Users can now convert NTFS to FAT and FAT32, which adds more flexibility in converting partitions, along with the ability to convert primary partitions to logical partitions or vice versa. Additionally, users can now regain a primary partition to install a new OS, or change the manufacturer primary and logical partition settings on new computers.

Enhancements to both the interface and wizards, based on valuable customer feedback, includes:

- Addition of a new merge partition wizard.
- Option to hide wizards.
- Colour-coded file system types with a colour key legend.
- Instruction wizards which provide only task-oriented options.
- Combined "Prepare for new OS" wizard and a "Create New Partition" wizard into a new single wizard called, "Create New Partition" wizard. This wizard now assists users who are installing a new OS with specific options that helps them create a partition specific to that OS.

Ability to view a list of pending operations - Provides users with the flexibility to review the steps that will be processed before applying the changes.

Improved on-line help and error checking in partition tables - Provides users with the ability to go into their partition tables and fix or change errors. PartitionMagic 5.0 will now prompt users during startup with any problems in the partition table.



UTILITIES

WebSearch Code: POW042
WebSearch Code: POW043

POW042

\$109

Upgrade
POW043

\$49

Lost & Found

Restoring lost data is just a few keystrokes away

Rather than spending thousands of dollars to send your hard drive to a data recovery centre, Lost & Found lets you automatically recover and restore data after accidental (or even intentional) data loss, or from corrupted media caused by a disk crash or logical system failure.

What makes Lost & Found an easier, more effective data recovery system?

Unlike other data repair and recovery software solutions, Lost & Found:

- Does not need to be installed prior to the recovery of lost or corrupted files.
- Does not alter, write to or attempt to repair critical sectors on the damaged disk, increasing the chances of a successful data recovery.
- Recovers your files even after reformatting, as long as you have not written over them.
- Performs a disk analysis and reports the odds of recovery via colour coding. Allows you to save data to a network drive.



POW041

\$109

WebSearch Code: POW041

Drive Image

The complete imaging solution for hard drive backups, upgrades and data recovery

Drive Image lets you easily create a compressed image file of an individual partition or an entire hard drive. This file can be stored on a network, JAZ, ZIP, CD-ROM or tape drive and then downloaded, to make quick work of backups, data recovery or upgrading to a new, larger capacity hard drive. With Drive Image, image files can be downloaded to drives of the same size or resized to fit drives of a different size and geometry for maximum flexibility.



CHK007

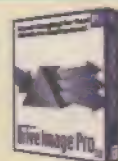
\$109

WebSearch Code: CHK007

Drive Image Pro 3.0

If it's not Drive Image - it's not an Exact Image!

Drive Image Pro 3.0 is a hard-disk imaging solution for IS professionals, service providers, and configuration centres.



CHK025

\$35 per user*

WebSearch Code: CHK025

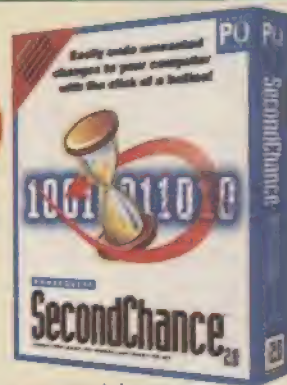
* minimum 25 users

Second Chance

Wouldn't you like one?

Have you ever changed a system setting and found that it hindered your computer's performance? Or downloaded a file that caused problems for your system? Perhaps you have unsuccessfully tried to get rid of a program that partially installed. Or maybe you're not sure what happened, but your computer just is not working as well today as it worked yesterday.

SecondChance acts as a first line of defense against system errors by periodically taking "snapshots" of the system. That way, it's possible to return to when the system worked properly and easily undo harmful or unwanted changes with a click of the button. And getting another chance is what SecondChance is all about. Don't take chances with your sanity - get SecondChance.



POW036

\$109

WebSearch Code: POW036

DriveCopy 2

The safest, easiest, and most affordable way to copy everything from your old hard drive to your new hard drive

There was a time when upgrading to a new hard

drive meant hours of downloading your data, applications, and operating systems to disk; then hours more of reinstalling everything to your new hard drive. If it all went well, you could be looking at a few days worth of work. Of course, there was always the risk of scrambling your data or losing it altogether in the process. Fortunately, now there's DriveCopy from PowerQuest. With a few simple steps, everything from your old hard drive is automatically copied to your new one without losing a single preference, setting, or byte of data. With DriveCopy you can now run your operating system, applications and data on a new, larger and faster hard drive.

So go ahead - update your dinosaur with a new high-capacity hard drive. With DriveCopy, it's never been easier or more affordable.



CHK022

\$49

WebSearch Code: CHK022



**PRICE
PLEDGE**

We will not be
beaten on price!
We cut prices not
corners.



**FREE
GIFT**

Make sure to ask
for your free gift
when ordering.



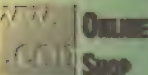
**FAST
DELIVERY**

Full range of
delivery options:
• Same day, Sydney*
• Next day*
• International*
*where applicable



**MASSIVE
RANGE**

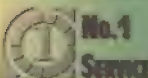
We aim to stock at
least 95% of ALL
the items we sell



**ONLINE
SHOP**

Check our online
store at

www.iswh.com.au



**No.1
SERVICE**

At an International
Company we have won
more awards for products
and services than any
software mail-order
company



ADDRESS

Unit 13 Bradford Estate
10 Bradford Street
Alexandria
New South Wales
2015



**OPENING
HOURS**

Sales Lines open
8.30am - 11.00pm (EST)
Monday to Friday
10.00am - 11.00pm (EST)
Saturday



**TERMS &
CONDITIONS**

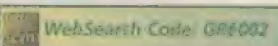
All prices include Sales
Tax. Prices subject to
change, see page 46 for
terms and conditions.



EXPRESS ORDERLINE 1300 300 003



Greenwich Mean Time



CHECK 2000 PC Deluxe

The Ultimate tool for beating the Millennium Bug!

CHECK 2000 PC Deluxe is the only integrated year 2000 testing tool that addresses all five "at-risk" layers of your PC. You can correct the BIOS, test the operating system and software programs, scan your data files, and flag data importing issues.

CHECK 2000 PC Deluxe gives you more:

- ✓ Helps find and correct the year 2000 hardware (BIOS) problems on the spot
- ✓ Flags problems in software programs, includes the world's largest database of remediation advice
- ✓ Lets you check new data from e-mail, internet, disks, CDs and other outside sources as often as you like
- ✓ Scans all the way down to individual cells in spreadsheets, databases, and other data files
- ✓ Helps you prioritize software and data problems for timely repair



"Today CHECK 2000 is established as the standard by which other year 2000 products are measured"
Microsoft Y2K Resource Centre.

GRE002
\$85

1 Test and Help Correct BIOS

A simple pass/fail screen tells you if your BIOS passes or fails the critical date tests. Then CHECK 2000 PC Deluxe will help correct the problems for you in 98% of BIOS types.

2 Check Your Operating System

CHECK 2000 will test your operating system, identify any 2-digit settings, and then recommend the changes you need to make. We check all of the popular operating systems, including: Win95/98, NT 4.0.

3 Keep Checking Imported Data

CHECK 2000 PC Deluxe identifies software programs that import and export data. Then Data Scanner finds date-dependent data so you can correct it.

4 Analyse Software Programs

Every application treats date-dependent data a little differently. CHECK 2000 PC Deluxe will do an inventory on your application programs - and show you which programs are most at risk (usually it's spreadsheets, databases, and schedulers). Year 2000 advice is provided on over 5,000 software programs. The knowledge base built into CHECK 2000 PC Deluxe recognises over 20,000 programs.

5 Pinpoint and Prevent Data Problems

Drill all the way down to the individual cells in spreadsheets - and other data files - that could cause problems. Correct the data as it's revealed to you by CHECK 2000, without switching between software programs. You can run the Data Scanner at any time, to continually reveal any new date-dependent data that comes into your PC.

ZipMagic 2000

Take the hassles out of Zip file

Nowadays, it seems you can hardly turn on your computer without running into a compressed ".ZIP" file. But just using Zip files can be a pain, often requiring a separate utility to "unzip" the file. Wouldn't it be nice if you could wave a magic wand and make Zip hassles disappear forever? You can with ZipMagic! Only ZipMagic makes your files look and act like regular Windows folders. See for yourself why ZipMagic is called the compression utility for the next millennium!

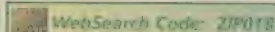
Features:

- Use Zip files without unzipping
- Use Zip files like regular Windows folders
- 16 Types of archive/email formats
- Integrated graphics file viewer
- Wizards to help you zip/unzip
- Zip Backup Wizard
- Email plug-in for Outlook
- Email plug-in for Eudora
- Create and span executable Zip files
- Automatically place large Zip files on multiple diskettes (spanning)
- Check Zip files for data integrity and attempt to repair damaged Zip files
- Open encoded email files
- Stop and resume Internet downloads
- Can update itself over the Internet
- DOS Command line option
- View and create sub-folders in a Zip file



ZIP018

\$59



Diskeeper V5

The leading disk defragmenter for Windows NT

Why do you need Diskeeper?

Windows NT Server and Windows NT Workstation do not ship with disk defragmentation utility software as do other Microsoft operating systems. Diskeeper solves the issue of degraded performance on your NT Servers and Workstations by optimising the disk file accessing mechanism ensuring you get the best performance from your most critical of system resources.

New in 5.0

New and exclusively engineered Frag Guard safely monitors and PREVENTS the fragmentation of your most critical NT system files: the MFT and the paging files! The result? Maintenance-free top performance of your busiest system files!

Advanced Windows compatibility! Have a mixed Windows environment? Would you like maximum system performance right across the boards? For the first time ever you can now remotely schedule the defragment of your entire Windows 95/98/NT network right from your desk! Plus, Diskeeper 5.0 includes a brand new easy-operate GUI that gives you greater control of your network and makes group scheduling any number of drives simple and fast.



Please note: Check system requirements before ordering. For full information on this product, visit our website at www.iswh.com.au

WebSearch Code: PIX017

WebSearch Code: PIX018

Single Workstation
PIX017

\$99

Single Server
PIX018

\$489

GRE005	CHECK 2000 Client Server (4-client).....	\$369
GRE001	CHECK 2000 PC	\$59
GRE008	Check 2000 Check & Fix	\$25
KIS001	KISS Modem Wizard 4.0.....	\$49
KIS042	KISS KeyView Pro.....	\$59
UNI010	UnInstaller Deluxe 5.0	\$79
CHK011	Star Trek DS9 Voice Print Security System.....	\$35
CON031	Conversions Plus 4.6	\$269

PIX019	Diskeeper 5 - Single Workstation Upgrade	\$59
PIX020	Diskeeper 5 - Single Server Upgrade	\$235
PIX021	Diskeeper 5 - 5-Pack Workstation.....	\$455
PIX022	Diskeeper 5 - 5-Pack Workstation Upgrade.....	\$209
VCO002	System Commander Deluxe.....	\$125
MCA146	PGP Personal Edition	\$69
MCA053	McAfee Toolbox 2000.....	\$49
MCA158	McAfee First Aid 2000 Deluxe.....	\$69



McAfee Office 2000

One Solution for Every PC Problem!

Now, you can protect, repair, secure, and optimise your PC with one integrated software package. McAfee Office is an assembly of award-winning, PC diagnostics and utilities tools that is the single solution for every PC problem:

VirusScan v4.02

#1 in Virus Detection and Removal

VirusScan features McAfee Macro Hunter technology to safeguard your PC from ALL viruses, and eliminate them before they can reach your system.

First Aid 2000 v6.02

Fixes & Prevents Problems - Automatically!

First Aid's extensive knowledge base of solutions solves tens of thousands of PC problems including software and hardware conflicts, configuration issues, multimedia glitches, Web connection hassles, and component bugs.

Nuts & Bolts v2.03

Fix up, Tune up, Clean Up and Speed Up Your System!

Nuts & Bolts protects your system and prevent crashes, while it diagnoses and alerts you to problems, assures program compatibility, rescues your files, fixes glitches, and enables you to operate at peak speed.

Y2K Survival Kit v1.0

Helps ensure that your PC successfully rolls over to the year 2000

Y2K Survival Kit searches its database of more than 1000 applications with known year 2000 issues and automatically downloads any Y2K program updates that are available via the Internet. It also checks and optimises Windows settings for operation beyond the year 2000.

Oil Change v2.5

Updates your software... Automatically!

Oil Change locates, downloads and installs bug fixes and updates for more than 6,500 of today's most popular programs via the Internet.

Uninstaller v5.12

Cleans Windows, Automatically

Uninstaller lets you identify the amount of disk space you want to free and then recommends the files for deletion, removing all of those unnecessary files that accumulate on your PC - Internet cache files, temp files, duplicate files, and more.

WebSearch Code: MCA160

* Offer ends 31st December 1999



OVER \$400 VALUE!

MCA160
\$129

McAfee VirusScan 4.0

#1 Virus Detection and Removal

Using only the latest technology, VirusScan detects 100% of viruses from floppy disks, Internet downloads, email attachments, Intranets, shared files, CD-ROMs, and online services. Over 25 million people, 40,000 companies, and 80% of the Fortune 1000 use VirusScan to help keep things running smoothly and virus-free.

VirusScan Delivers 100% Detection

The threat of virus infection is now greater than ever! The need to protect your PC has become vital as there are now over 40,000 known computer viruses with more than 300 new viruses being created each month. VirusScan uses an array of scanning features to keep your system virus free. With new Hunter technology, VirusScan detects 100% of viruses in leading lab tests, including boot sector, file, multipartite, stealth, polymorphic, encrypted and macro-such as Word and Excel viruses. It even protects against the newest threats to data security: Office 97/2000 macro viruses.

Best Online Protection

If you surf the web you are at risk of contracting a virus! More than 70% of all virus infections are being transmitted via Internet downloads and e-mail attachments. VirusScan provides powerful protection for anyone on the web by scanning all Internet down-loads and e-mail attachments to stop viruses before they infect your system.

Easy to Use

VirusScan features an intuitive point-and-click interface for both scanning and configuration. It also features hands-free infection repair for automatic cleaning of complex and multiple infections. McAfee's new ScreenScan utility automatically launches scans whenever your screen saver is active. Our electronic virus encyclopedia and calendar deliver expert information on the latest viruses.

Always Up-to-Date

McAfee's AVERT (Anti-Virus Emergency Response Team) labs are located around the world to hunt down and provide cures to the latest virus emergencies at any time of the day or night. McAfee also offers a convenient and automatic way to update VirusScan with SecureCast by pushing upgrades and updates* directly to your desktop, eliminating the time and effort associated with many other anti-virus products.

The World's Best Support!

McAfee offers FREE* updates for the life of the product. And, if you ever have a problem McAfee offers the most qualified technical support technicians in the industry, as well as free online support*-available 24 hours a day, 7 days a week.



\$60 CASHBACK**

MCA070
\$69

\$40 CASHBACK**

Also available:

MCA076 ..McAfee VirusScan Deluxe**\$99**

** Offers ends 31st December 1999

* Modem and Internet access required for electronic downloads

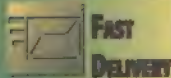
WebSearch Code: MCA070



PRICE PLEDGE
We will not be beaten on price!
We cut prices not corners



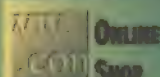
FREE GIFT
Make sure to ask for your free gift when ordering.



FAST DELIVERY
Full range of delivery options:
• Same day, Sydney*
• Next day**
• International*
*where applicable



MASSIVE RANGE
We aim to stock at least 95% of ALL the items we sell



ONLINE SHOP
Check our online store at
www.iswh.com.au



No.1 SERVICE
As an international company we have won more awards for products and services than any software mail-order company



ADDRESS
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Alexandria
New South Wales
2015



OPENING HOURS
Sales Lines open
8.30am - 6.00pm (EST)
Monday to Friday
10.00am - 3.00pm (EST)
Saturday



TERMS & CONDITIONS
All prices include Sales Tax. Prices subject to change, see page 46 for terms and conditions.



EXPRESS ORDERLINE 1300 300 003

MAUS Employee Manual

Create a Customised Employee Manual!

MAUS Employee Manual is the simplest way to create a handbook encompassing all of your organisation's employee policies and procedures. It comes complete with sample policies that you can use, in addition to all the important forms you may need.

The program's unique step-by-step process will ensure that your business has its own customised manual, protecting it from all-too-common litigation in areas such as Unfair Dismissal and Sexual Harassment. Protect your business today!

- Helps fulfil your legal obligations.
- A Step-by-step Questions & Answers format.
- Comes complete with over 70 policies, procedures and forms.
- Improve productivity and motivation amongst all employees.
- No expensive consulting, royalty or commission fees.
- Publish your manual in hard copy and on your network or intranet.

Policies Included

- Overtime Policy
- EEO
- Sexual Harassment
- Wages & Salary
- Sickness Benefits
- Maternity Leave
- Employment Conditions
- Annual Leave
- Anti-Discrimination
- Termination

WebSearch Code: MAU011
WebSearch Code: MAU013



MAU011

\$169

MAUS HR Suite

Job Descriptions
+
Performance Review
+
Employee Manual

MAU013

\$469

MAUS Stockmarket Plus

Easy Start Sharemarket Software

Over 5.5 million Australians are now investing in the stockmarket....grab your slice of the action!

3 Great Reasons to Choose MAUS Stockmarket Plus

- 1 Portfolio Manager - Records every aspect of your share portfolio you'll ever need in an easily accessible format.
- 2 Charting & Query Tools - Pinpoint new and exciting investment opportunities using the user friendly charting and query functions.
- 3 Instant Tax Reports - Save literally hours of frustration at tax time using the automatically generated Australian Tax Reports.

Key Benefits

- Professional investment advice in simple English
- Manage stocks, personal finances, property, etc
- Track investments in any ASX listed company
- Download stock prices for fast, accurate analysis

WebSearch Code: MAU007

MAUS Stockmarket Plus...."is ideal for both novice and experienced investors who require a package to keep track of their stockmarket investments...."

Seldom does a software package completely outclass competitors, offering users a clearly superior product in terms of sophistication, simplicity and obvious attention to detail"

Review of core software - Personal Investment Magazine, 1997

MAUS Stockmarket Plus...."is specifically designed for monitoring a share portfolio and has the added advantage of providing analytical tools as well as keeping the records you need"

Review of core software - Editor of Money Section (SMH 17/9/97)



MAU007

\$169

MAUS Consultant's Pack

Become a successful Business Planning Consultancy

Used by 1000's of Accountants and Consultants, the MAUS Consultant's Pack will give you the forms, tools and know-how to establish a successful Business Planning Consultancy overnight. Includes information on setting up your consultancy service, promoting and costing your services, impressing your clients and a step-by-step guide for every assignment. Software contains over 80 pages of forms and management question checklists, overheads for training, sample proposals, press releases, advertisements and much more!

Includes:

- MAUS MasterPlan Consultant's Edition
- New customisation features
- Consultant's Guide to Business Planning
- Unique Consultancy Software
- Questionnaires for clients
- Complete training manual

WebSearch Code: MAU003



Used by 1000's of accountants and consultants



MAU003

\$469

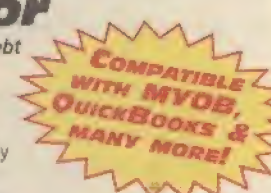
MAUS Debt Collector

The easy approach to debt collection

MAUS Debt Collector is a complete debt collection system which automatically mail merges reminder and demand letters, reminds you of phone calls and action to take, and prompts you step-by-step through the entire debt collection process. To monitor your success, this revolutionary new product includes a unique graphing and reporting feature to quickly assess your current debtor position.

Key Benefits

- Automatically sends 30, 60 and 90 day reminder letters
- Stand alone contact manager stores all debtor details
- Includes professional letters, legal documents & advice
- Reduce bad debts
- Links Directly to MYOB, Quickbooks and most accounting systems.



MAU009

\$169

WebSearch Code: MAU009

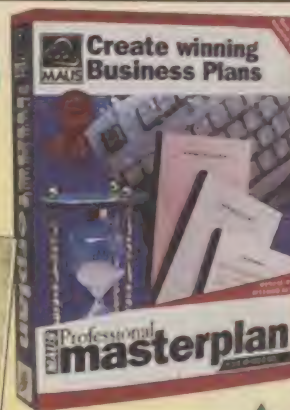


MAUS MasterPlan Pro

Business and Marketing Plans the Easy way!

MAUS MasterPlan is the easy way to create professional Business and Marketing Plans. A simple question and answer format leads you through the entire planning process, allowing you to analyse, improve and grow your business. The award winning software creates full financial forecasts, strategies and graphics all at the click of a button.

The new MAUS MasterPlan has a broad range of new features specifically designed to meet the needs of Australian users in both product and service industries. Topics covered include Sales Analysis, Market Analysis, SWOT Analysis, Marketing Plan, Financial Plans and much more. With MAUS MasterPlan, your Business Plans will be more effective, more impressive, and will greatly improve your chance of success!



Enterprise Edition now available

Key Benefits

- Includes 5 User licence
- Network & email ready
- Planning system for multiple managers
- Customise the software to suit



Maus MasterPlan
Enterprise edition
MAU014
\$459

Key Benefits

- Create Business & Marketing Plans easily
- Simple question and answer format
- Creates full financials and graphs
- Suitable for business people of all levels

WHAT THE PRESS ARE SAYING

"The brilliance of this system is that you're led through the entire process step by step... the results will be as good as anything a professional would have provided for you"

"Your Computer Magazine"



000000 6/6 Ease of Use
000000 5/6 Features
000000 5/6 Value for Money
000000 6/6 Overall

PC @authority (January 1999)

MAUS MasterPlan for Windows -
Level 2 Professional
AU\$501

\$169

WebSearch Code: MAU014

WebSearch Code: AU\$501

MAUS MasterPlan & Action Planner

Ideal for anyone developing a Business Plan AND serious about implementing it. With direct links to MasterPlan, MAUS Action Planner breaks up your plan into short term objectives, creating weekly and monthly Action Plans for each employee. Set employee tasks, monitor performance and generate reports all at the click of a button. This is the ultimate Business Planning package!

Key Benefits of Action Planner

- Use your Business Plan in day to day operations
- Sets tasks, goals and KPI's for employees
- Reports and graphs staff performance
- Direct links between the software



THE
ULTIMATE
BUSINESS
PLANNING
PACKAGE



SAVE
\$30

BuyBoth & Save
MAU010

\$308

WebSearch Code: MAU010

MAUS Job Descriptions & Performance Review

WHAT THE PRESS ARE SAYING:

"Job Descriptions offers 3,500 professional descriptions and Performance Review gives a list to follow when judging staff performance."

Sydney Morning Herald
(18th August 1998)

"...Ideally designed to be used in conjunction with job interviews, HR planning and annual staff reviews"

The Age (25th August 1998)

"...simple, affordable, revolutionary"

Instore Magazine (September 1998)

000000

6/6 Value for Money
PC @authority (October 1998)



PC
USERS BEST
PRODUCTS
OF 1998



SAVE
\$30

BUY BOTH AND SAVE
MAUS Job Descriptions &
Performance Review
MAU006

\$308

WebSearch Code: MAU006

MAUS Performance Review

For fast, effective employee appraisals!

Described by PC @authority as "one of the first products any manager should load onto their PC", MAUS Performance Review will help you create accurate, personalised employee reviews in minutes!

Simply choose from the dozens of performance criteria such as initiative, leadership, problem solving ability, and sales skills.....to name just a few! Next, use the simple 1 - 5 grading system to rank your employees in each area.

MAUS Performance Review will then support your ratings with clear, effective text...

...It's that fast. It's that easy!

Key Benefits

- Save 50-90% of the time to write employee reviews
- Simple step-by-step approach
- Record ongoing problems and achievements
- Accurate, personalised reviews
- Clear, natural text flows



MAU004

\$169

WebSearch Code: MAU004

MAUS Job Descriptions

Write job descriptions in minutes!

MAUS Job Descriptions will help you create clear, concise job descriptions in minutes!

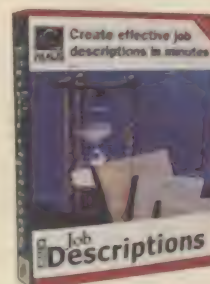
Simply choose from the thousands of built-in jobs and edit or even combine duties from different jobs. Next, use the simple question and answer approach to address the physical and educational requirements, work environment, qualifications and supervisory responsibilities.

MAUS Job Descriptions will then take your answers and write a comprehensive job description that's fully customised to your organisation...

...It's that fast. It's that easy!

Key Benefits

- Create job descriptions in minutes
- Over 3,500 sample job descriptions to choose from
- Hire the right people
- Improve productivity
- Protect your organisation against unfair dismissal claims



MAU005

\$169

WebSearch Code: MAU005



**PRICE
PLEDGE**

We will not be
beaten on price!
We cut prices not
corners.



**FREE
GIFT**

Make sure to ask
for your free gift
when ordering.

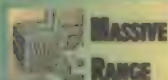


**FAST
DELIVERY**

Full range of
delivery options:

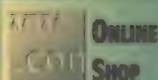
- Same day, Sydney*
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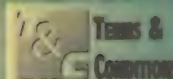
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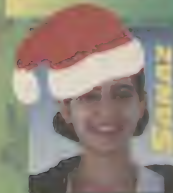
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Dragon Naturally Speaking Preferred v4

Continuous speech recognition Ground breaking technology, award winning performance

Dragon Naturally Speaking is the world's first and foremost software product that recognises and creates text from normal continuous speech. Dragon Naturally Speaking is acclaimed in competitive reviews for its accuracy, performance and ease of use. Just talk to your PC naturally, at a conversational pace. Dictate entire paragraphs at a time. Write email messages, create reports, draft letters, and edit proposals just by speaking.

Top Features

- **High Accuracy** - PC Magazine reported Dragon Naturally Speaking "achieved 98 to 99% accuracy" in competitive testing!
- **Very Large Vocabulary** - A vocabulary of 250,000 terms and more than 160,000 active words assures that: What you say is what you get.
- **Control Your Desktop** - Open applications from the Start menu, switch from one application to another, and give commands like "Start Internet Explorer" by voice.
- **Multiple User Support** - Different users can share the same program by creating and storing their voice files on the same computer.
- **Fast Setup** - Learns your voice in just a few minutes so you can be up and running quickly!
- **Broad Compatibility** - Dictate into virtually any Windows application, including Microsoft Word 97 & 2000, Corel WordPerfect 8 & 9, America Online, and Lotus Notes.
- **Internet-Friendly** - Browse the Web and use hotlinks by voice, when using Microsoft Internet Explorer 4.0 & 5.0. Talk into chat rooms at up to 160 words per minute!



DRG009

\$319

WebSearch Code: DRG009



Dragon Naturally Speaking Mobile

Continuous speech recognition for people on the move

Create text anywhere

Dragon Naturally Speaking Mobile is the complete speech recognition system for people on the move.

- Holds up to 40 mins of continuous speech on built in memory cards.
- An additional 80 mins can be stored on removable memory cards.
- Speak at up to 160 words per minute.
- File your recordings into folders for ease of use.



**Don't Be Chained To Your PC. Talk
To Your PC Anytime Anywhere.
Its so easy!!**



Press 'Record' button and speak into the recorder's built-in microphone.



Select which recordings you want transferred to the PC.



Connect the recorder to your PC using the included cable.



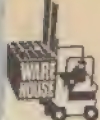
Press 'Transcribe' and your recorded speech appears as the text on your screen and in your document.

WebSearch Code: DRG006

DRG006

\$439

DRG008	Dragon Naturally Speaking Standard v4.0.....	\$179	M55023	MS Project 98	\$739
DRG010	Dragon Naturally Speaking Essentials v4.0.....	\$89	M55024	MS Project 98 Upgrade	\$299
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MCSE NT4 Certificate Interactive CD-ROM Tutorials

Essential if thinking of becoming a Microsoft Certified Systems Engineer NT4

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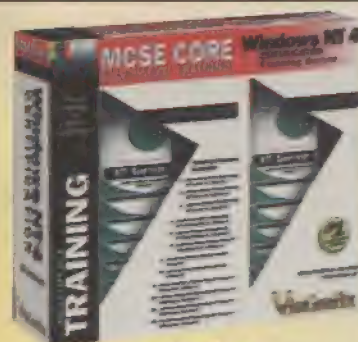
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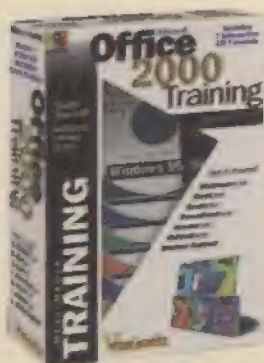
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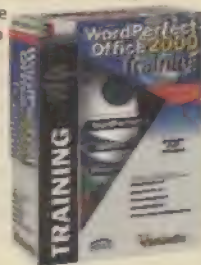
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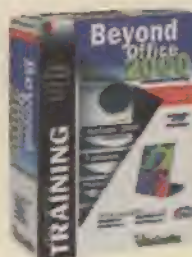
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Microsoft Visual Studio 6.0

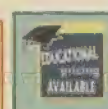
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Product/Components	Description	Pro.	Ent.
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Enterprise Visual Database Tools	Visually design databases and views, and create and test stored procedures for Microsoft SQLServer 6.5+ and Oracle 7.0+ databases.	•	•
Microsoft BackOffice 4.5 Developer Edition (for Windows NT only)	Build Windows NT-based solution that can be accessed from Windows-based or Web-based clients and integrated in enterprise environment with selected server technologies form the Microsoft BackOffice family. The Development License for Microsoft BackOffice Server 4.5 includes Microsoft SQL Server, Microsoft Exchange, Microsoft SNA Server, Microsoft Site Server, Microsoft Systems Management Server and Windows NT Server.	•	•
Team Support	Microsoft Visual SourceSafe version control system version 6.0, Visual Component Manager, and Microsoft Repository.	•	•
Application Design Tool	Design multi-tier applications with Visual Modeler.	•	•



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WebSearch Code: MSS053

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MSS054
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Build powerful applications fast!

Microsoft Visual Basic 6.0 is the most productive tool for quickly creating fast business solutions.

With its Rapid Application Development (RAD) environment, developers can quickly create and deploy super-fast client/server applications, plus easily develop Web applications.

Visual Basic is the leader in RAD with its visual user interface (UI) designer providing developers with intuitive drag-and-drop UI creation. It also has many pre-built components and fast creation of custom components that can be either client or server based.

FROM
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Learning Edition
MSS057
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WebSearch Code: MSS057



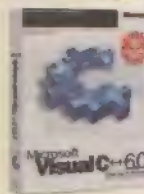
Visual C++ 6.0

Visual C++ 6.0 is the most productive C++ tool for optimised high-performance Windows and Internet development. It is also a tool of choice for creating scalable, multi-tier corporate applications where performance and reliability are critical.

Key Features

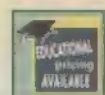
- Make changes during your debugging session and continue on without rebuilding.
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- Up to a 30 percent faster compile time.

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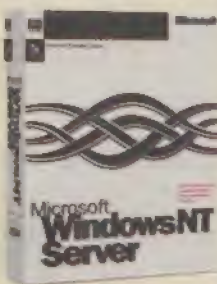
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Microsoft Windows NT Server 4.0

Key Features:

- lower operating costs
- leverage your existing systems
- globally manage users and security from a central location
- reduce communication costs by using a VPN to dial in via the Internet
- create professional-quality Web sites easily
- build and deploy powerful intranet applications quickly
- manage all Web sites across an entire network from a single location



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WebSearch Code: MIC583

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MIC463
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(+ 5 Client) Upgrade
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Microsoft Windows NT Workstation 4.0

Powerful Performance and Reliability

Key Features:

- ease of use
- secure, easy access to the internet and Corporate intranets
- Improved network integration
- Improved management features
- mobile computing
- multimedia and graphics improvements
- application programming interfaces and additional features



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Microsoft Windows 98 Second Edition

Enhance your productivity and redefine your PC's possibilities using the Microsoft Windows 98 operating system. It provides full internet integration, optimal performance and support for the latest entertainment and accessory options.

Microsoft focused on advancing Windows 98 in the following areas with the release of Windows 98 Second Edition:

- Making it work better by enhancing hardware support and improving the initial PC user experience.
- Delivering home networking capabilities through Internet Connection Sharing, which enables multiple users to seamlessly and securely access the Web at the same time, using a single shared Internet connection.
- Delivering an improved online experience with Microsoft Internet Explorer 5 and Microsoft Windows NetMeeting conferencing software version 3, which provides users with a fast and easy way to use browsing and Internet conferencing software.

Key new features and enhancements:

- Internet Explorer 5, the new version of Microsoft's award-winning browser software, is included.
- Internet Connection Sharing enables multiple users to seamlessly and securely access the Web simultaneously via a shared Internet connection.
- NetMeeting conferencing software version 3, the new version of Microsoft's real-time collaboration and conferencing client, introduces a smarter user interface, data conferencing security, enhanced standards support and more.
- Enhanced 1394 support supports key controller interface protocols.
- Advanced Configuration and Power Interface (ACPI) advancements deliver hardware optimisations and

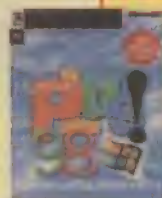
more granular control over settings on a device-class basis.

- High-bandwidth modem support delivers driver support for leading ADSL modems.
- USB improvements include the capability to work with devices on a per-device rather than a per-port basis.
- WDM modem support supports USB modems and enables hardware vendors to write a single WDM modem driver for Windows 98 and Windows 2000 Professional.
- WebTV for Windows updates provide support for a broader array of tuner cards and help set the standard for the combination of high-bandwidth data and video.
- DirectX API 6.1 delivers a variety of improvements to Windows multimedia technologies, including better audio and video synchronisation.
- Processor and motherboard optimisations for the latest hardware technologies, including Intel Pentium III, are featured.
- Device Bay support enables a system to ship with Device Bay hardware.
- Windows 98 Service Pack 1 addresses issues with existing Windows 98 features and includes the Windows 98 year 2000 update and Internet Explorer 4.01 Service Pack 2.

Now with Plus! 98

The ideal companion for Windows 98

Enhancements for work and play include powerful system utilities, new themes and cool games.



Microsoft Windows 98 2nd
Edition U/G
MIC771

\$149

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Microsoft Encarta Reference Suite 2000



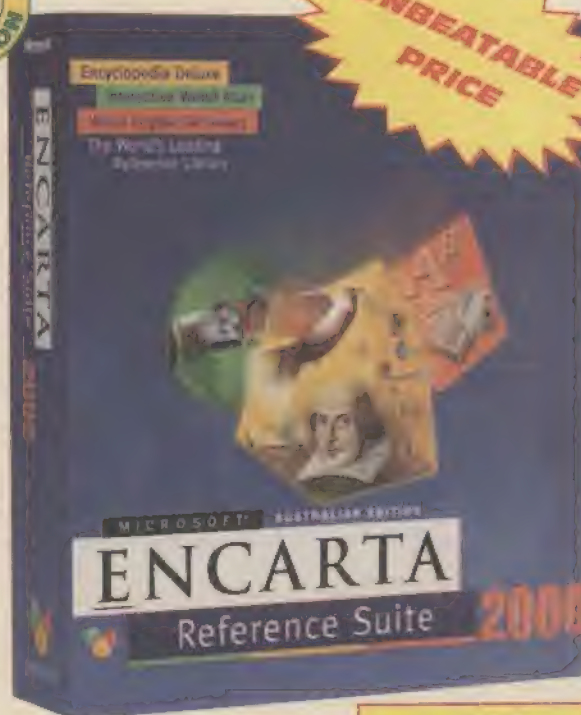
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- Also experience the new Multimedia Map which displays images, world music, flags, national anthems and more. Or explore fascinating geologic and geographic phenomena with the new Map Treks.
- Enrich your command of the English language as it is written and spoken around the world with the unique Encarta World English Dictionary.
- The first newly written English dictionary in 30 years-contains 400,000+ authoritative references, word histories and usage notes, including new English words and phrases.
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- Make learning an ongoing adventure. All suite products work together to inspire a passion to learn, explore, discover and create.
- Online updates for Encarta Reference Suite 2000 are made available on the Internet each month from June 1999 to December 2000 at no additional cost. Access to and use of the Internet may require payment of a separate fee to an Internet service provider. Connect time charges may apply.

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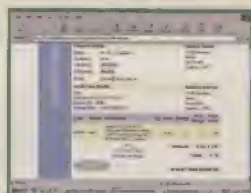
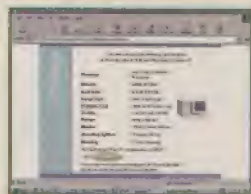
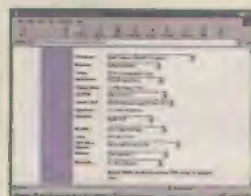
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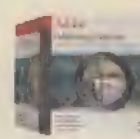
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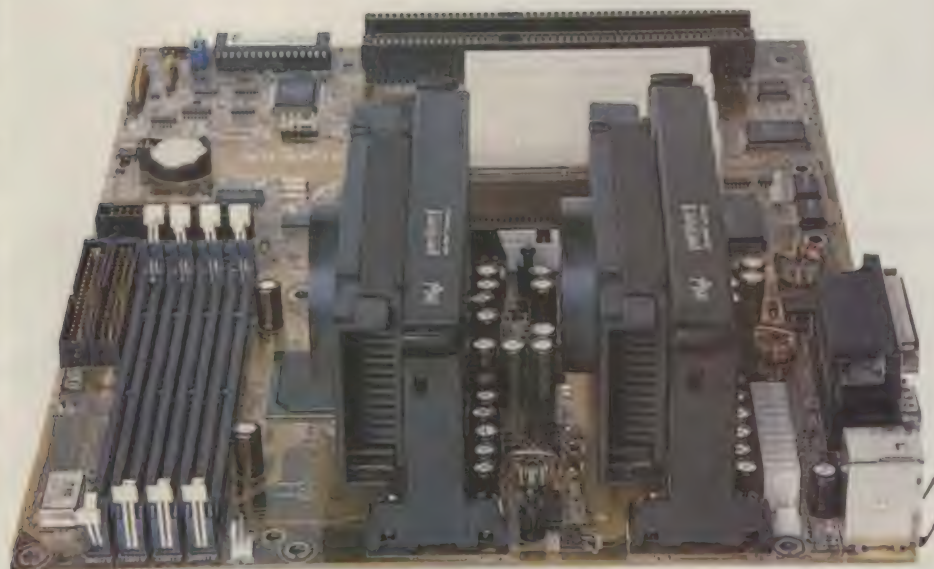
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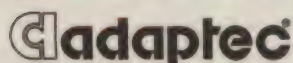
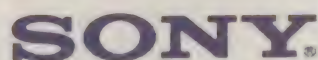
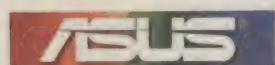
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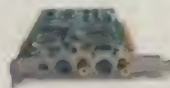


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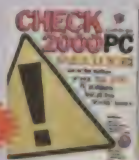
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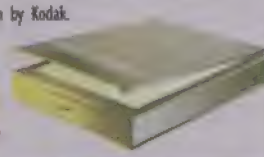
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HP Desk Jet 710/720/890 Series	3x3	30B-CLR
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EPSON Stylus 820/colour II/Its	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
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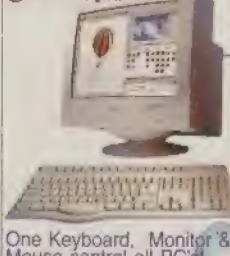
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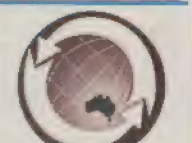
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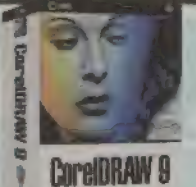
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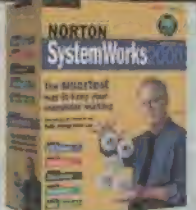
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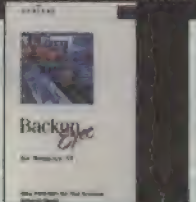
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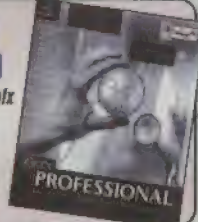
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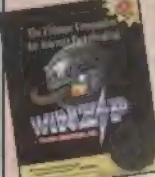
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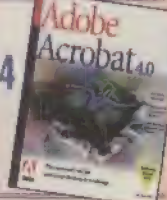
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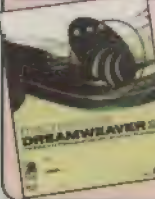


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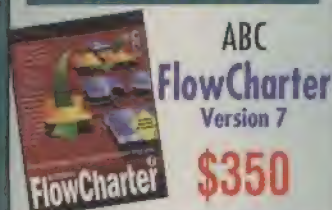
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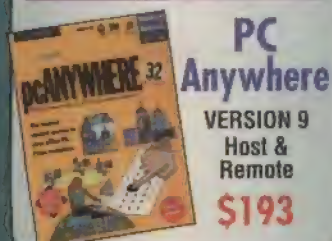
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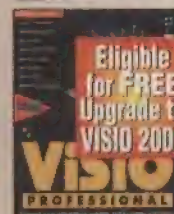
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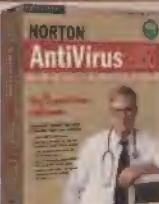
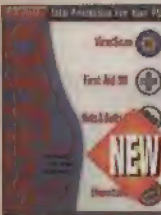
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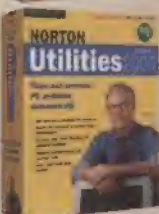


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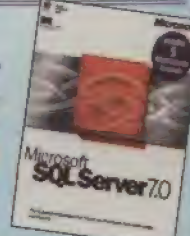


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EPSON Stylus 820/colour II/III	3x12
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12
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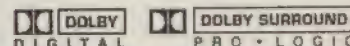
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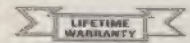
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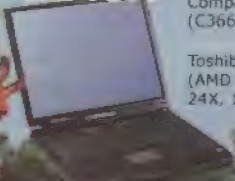
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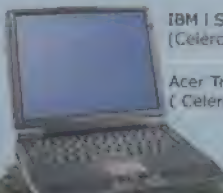


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 Epson Stylus 400 / 800 / 800+ / 1000
 Epson Stylus Color Pro / XL
 Epson Stylus Color 400 / 800
 Epson Stylus Color 500 Not the same ink as the 400 / 600
 Epson Stylus Photo / Photo EX / photo 700
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 Epson Stylus Color 740 (900 & 1200 available)
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 Epson Stylus Color 300 (four colour cartridge)
 Lexmark/IBM 4076/1020/2030/2050/2070/1000
 Lexmark/IBM 2030 / 2050 waterproof
 Lexmark/IBM 2030 / 2050 photo
 Lexmark/IBM 5000, 5700, 7000 (photo available)
 Olivetti JP150/170/192/250/350/360/450/3100

Black kit code No refills Colour Kits Code No refills

K18BK	9*	K9CLR	12
K20BK	9*	K10CLR	12
K3BK	6	K22CLR	6
K3BK	6	K11CLR	6
K5BK	8	K12CLR	3
K5BK	8	K12CLR	3
K1BK	9*	K9CLR	12
		K25CLR	5
K7BK	60	K1CLR	30
K8BK	7	K2CLR	12*
K4BK	7	K2CLR	12*
		K23CLR	6
K9BK	7	K3CLR	8
K10BK	15	K4CLR	4
K11BK	12	K5CLR	30
K12BK	50	K5CLR	30
K12BK	9*	K5CLR	30
K27BK	6	K5CLR	30
K19BK	2	K24CLR	12*
		K15CLR	12*
K13BK	12	K20CLR	12*
K16BK	12	K7CLR	12*
K14BK	12	K6CLR	12
K15BK	8	K8CLR	6
K17BK	12	K20CLR	12*
K17BK	12	K8CLR	6
K17BK	12	K17CLR	12*
K21BK	3	K34CLR	3
K26BK	12	K16CLR	12*
K6BK	12	K16CLR	12*
K6BK	12	K35CLR	6
		K33CLR	12*
K18BK	6	K13CLR	12
K24BK	6	K13CLR	12
		K29CLR	12
K25BK	6	K30CLR	12
K20BK	8	K19CLR	12

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15184 A3 90GSM HI RESOLUTION PAPER	200	\$ 24.00
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15185 A3 WHITE 100UM PHOTO FILM	100	\$100.00
16811 A4 CLEAR 100UM TRANSPARENCIES	50	\$ 42.00
16425 A4 150GSM FULL GLOSS PHOTOBASE	50	\$ 49.00
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61755 A4 150GSM GLOSSY PHOTO ECONOMY	50	\$ 29.00
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Canon BJC-800 Colour	\$ 13.00 *
Canon BJC-70 Black x3	\$ 13.00 *
Canon BJC-80 Black x3	\$ 13.00 *
Canon BJC-80 Colour x3	\$ 20.00 *
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Epson EPS S020047	\$13.50 *
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Epson EPS S020025	\$12.00 *
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Epson EPS S020062	\$24.00 *
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Epson EPS S020049	\$22.00 *
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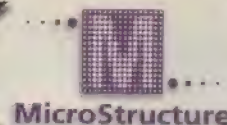
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10G Fujitsu	568
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6.4GB IBM	466

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100Mb USB Port	251
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100Mb/1GB Cartridge	21 / 176
2.0GB Cartridge	199

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Exabyte 4.4G TR-3 Int	283
Seagate 4.0G TR-4 Int	482
Exabyte QIC-3020 Tape	52
Exabyte 4.0G TR-4 IDE	553
Verba TR-3 2.2G-4.4G Tape	70
Verba TR-4 4G Tape	70

Sony Dai 4G-8G Int SCSI	1439
Sony Dai 12G-24G Int SCSI	1622
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Sony 4mm 90M 2G Tape	73
Sony 4mm 120M 4G Tape	131
Sony 4mm 125m 12-24G Tape	271
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9.5GB Fujitsu U2W 10000rpm	736
9.5GB Fujitsu U2W 10000rpm	857
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16M Voodoo 3 2000 AGP	246
16M Voodoo 3 3000 TV out AGP	324
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Mother Board	
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PowerColor SCK 7 AT	137
Epox Pentium 3 440BX	185
Gigabyte GA-5AAS12 AT	155
Gigabyte GA-6LX7 SCK 370 AT	165
Gigabyte GA-6BXC ATX	205
Gigabyte GA-6BXD	336
Gigabyte GA-6BXDS	628

CPU	
Intel Celeron 433A	168
Intel Celeron 466A/500A	200/302
AMD K6 2 400/450MMX	115/140
AMD K6 3 400/450MMX	241/343
Pentium III 450	370
Pentium III 500	474
Pentium III 550/600	703/932

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17" Diamond Tron 1795 0.25 dot	730
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56K Xircom with Ethernet RJ45	599
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HP 6300C 1200x2400 dpi	843
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HP Photosmart S20	882
Epson GT7000 USB	396
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Artex 1236 USB 36 Bit Optical	183

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Serial/Logitech 3 Button PS2	15/ 25
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ATX Case Dual Midl/Full	75/234

Printer	
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Epson LQ570/LQ870	599/897
Epson LQ1070	830
Stylus 440/640	210/298
Stylus 740/850/900	436/815/746
Epson Stylus1200 A2	919
Epson 1520/3000 A2 Size 896/3183	
HP 695C	211
HP 810C/880C Parallel/USB	335/480
HP 895CXI	615
HP 1120C A3	743
HP 2000C / Jetdeck	881/1579
HP 2500C/2500CM	1997/2891

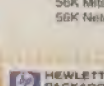
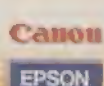
HP LaserJet 1100	768
HP LaserJet 1100A with Scan	908
HP Colour LaserJet 550A 5387/7074	
HP LaserJet 4000/T	2262/2765
HP LaserJet 4000/NTN	2752/3401
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HP Ljet 8000/400N	4654/5163/6001
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BJC 50 Portable Colour	581
BJC 265 /2000	135/173
BJC 7100	491
BJC 5600 A3 Size	373
BJC 5500 A2 Size	1236
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BJC 80 Portable Colour	331
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System	
AMD66 11 400MMX	1606
AMD66 11 450MMX	1632
AMD66 11 400/450MMX	1740/1827
Intel Celeron 433A	1615
Intel Celeron 466A/500A	1658/1758
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Canon 210SP	BC03/BX03	3	27C8
Canon BJ-300/330	BJI-642	2	2688
Canon BJC-600 Series	BJC-201	8	2588
Canon/Apple BJC-4000/5500	BCI-218	15	0788
Canon/Apple BJC-4000/5500	BC-20	3	0488
Canon BJC-7000 & Optimiser	BC-60	2	5288
HP Deskjet 400/500 Series	51625A/33M	2/3	1688
HP Deskjet 600 Series	51629A	2	1488
HP Deskjet 800 Series/1600c	51645A	2	1288
Epson Stylus 400/800/1000 (1st ref.)	S020025	6	2388
Epson Stylus Colour/Pro/XL	S020034/62	4/2	2288
Epson Stylus Colour 820/11/11s	S020047	4	2088
Epson Colour 400/500/600	S020093	6	1888
Epson Colour 800/1520	S020108	4	1888
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Canon/Apple BJC-4000/5500 Series	BCI-21C	3x30	06XX
Canon BJC-7000	BCI-61	3x4	51XX
HP Deskjet 400/500 Series	51625A	3x10	15XX
HP Deskjet 600 Series	51649A	3x10	13XX
HP Deskjet 800 Series/1600c	51641A	3x6	11XX
Epson Stylus 200/500	S020097	3x10	19XX
Epson Stylus Colour/Pro/XL	S020036/66	3x8/2	21XX
Epson Stylus 820/11/11s	S020049	3x10	19XX
Epson Stylus 400/600/800/1520	S020089	3x10	17XX
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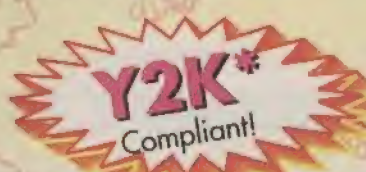
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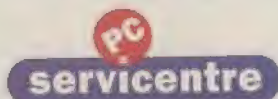
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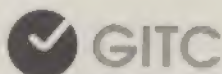
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Learn how to avoid Y2K problems, advertise online, use Lotus Notes and keep track of your finances.

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Y2K Bible: Procrastinator's Edition

Some might think 542 pages are a lot for a procrastinator to read, but we'll give this book the benefit of the doubt.

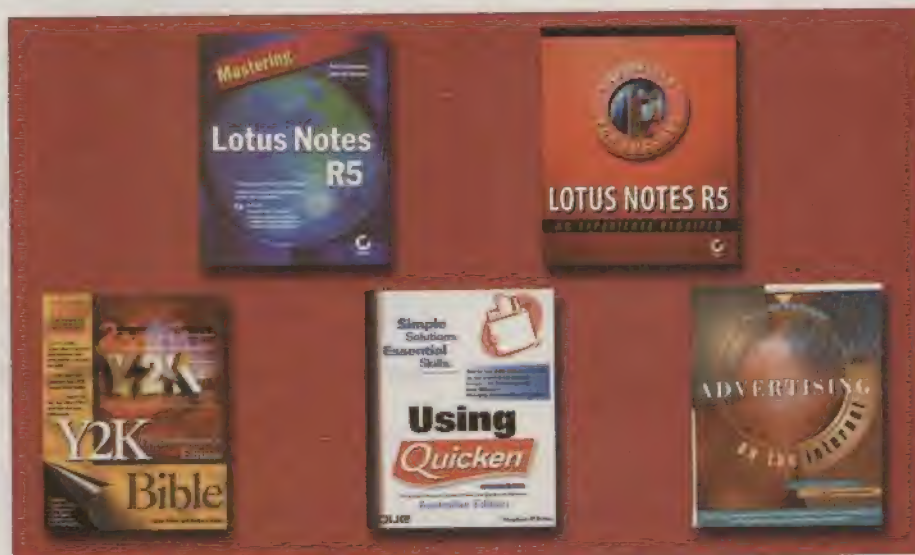
Y2K Bible: Procrastinator's Edition is aimed at individuals and small business. It starts with the very basics, so many readers will find that it devotes many pages to stating the bleeding obvious. One early subheading asks, 'What is a computer?' (Admittedly, this is to introduce the concept of embedded chips.)

The book is short on specifics — there are no lists of compliant or vulnerable software packages — but the general procedures for attacking Y2K in a personal or small business situation are very sound. If you already know enough about the problem and are looking for a guide to Y2K repair, look elsewhere. The *Y2K Bible* takes a long time getting to the point and a relatively short time offering practical advice.

The book also tends to sound alarmist. It caters to the doomsayer element, and there are huge checklists of preparations for your home or business and many highly unlikely 'what if' scenarios. At one point the authors use a cut in the supply of insulin due to Y2K problems as an example of why some people might need to take extra precautions. Nowhere, though, is it explained how insulin supplies, in particular, will be affected.

Y2K remains a big problem and the core advice in this book will help you understand and fix it, but if you're just starting out, something more concise would be of greater help. You might be able to get the book cheaper in the January sales — it will still be a good buy, because the authors clearly intended it to be of ongoing benefit against Y2K problems that may surface throughout next year.

Simon Vandore



Author	Jesse Feiler and Barbara Butler
Publisher	IDG Books
Distributor	Woodslane
Phone	(02) 9970 5111
Price	\$59.95
ISBN	0-7645-3359-2
Rating	★★★

Advertising on the Internet

Advertising on the Internet, Second Edition, is one of hundreds of books dealing with online promotions. It stands out as an excellent resource for businesses of all sizes that wish to capitalise on this new advertising medium.

Authors Robbin Zeff and Brad Aronson cover issues, such as the art and science of Web measurement, pricing online ads and legal issues, that many of us are struggling to understand. They approach the content from two perspectives: as both a buyer and a seller of online advertising.

The text is complemented by useful sidebars such as hints and tips (from how to get your ads noticed, to choosing a Web measurement solution), market research statistics, example screenshots and half-page reflections by guest contributors.

Although this is an American book, the majority of the information is applicable to Australian readers, as the underlying philosophies of online advertising transcend national boundaries.

There is an extensive resource directory at the back of the book that will assist you in contacting key companies, products and services within the online advertising industry. You'll find email discussion lists and newsletters for the Internet advertising and marketing industry, lists of search engines, Web sites and resources on the topic and online versions of relevant publications. There is also a list of companies which deal in measurement technologies, market research, loyalty programs,

Guide to ratings

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|-------|---|
| ★ | Pine needles: Dead on the floor |
| ★★ | Candy canes: Only just hanging in |
| ★★★ | Tinsel: Looks good all-round |
| ★★★★ | Christmas lights: Shine brightly |
| ★★★★★ | Christmas angel: Absolutely top of the tree |

auditing services, banner exchange programs and so on. Again, while these are predominantly US resources, the physical location is irrelevant for many services.

This book will suit a variety of readers, from those interested in understanding how their organisation can capitalise on this new promotional medium through to those involved in developing online marketing strategies and maximising their company's online presence. It is definitely one of the better books available on the topic.

Cathie Kennedy

Author	Robbin Zeff and Brad Aronson
Publisher	John Wiley & Sons
Distributor	John Wiley & Sons
Phone	(02) 9805 1100
Price	\$45
ISBN	0-4712-9713-5
Rating	★★★★

Mastering Lotus Notes R5 and Lotus Notes R5: No Experience Required

Mastering Lotus Notes R5 and *Lotus Notes R5: No Experience Required* are surprisingly similar books from the same publisher. Both books aim to teach people how to use the new Lotus Notes client.

Both books also spend far too much time explaining the very basic use of Notes, such as configuring user preferences or using the mail application — two things which are quite intuitive and have extensive online help. In fact, *Lotus Notes: No Experience Required* only begins on lesser-known topics such as using group workspaces, sharing databases or using advanced search features about two-thirds of the way into the book.

It is difficult to identify exactly who these books are targeted at. Lotus Notes isn't a program many people would tackle at home and most companies would use a few days of in-house training to achieve what these books do in 500 to 800 pages. The only real use would be to keep a copy around the office as a reference.

Assuming these books are actually used by staff trying to become more proficient with this application, the choice between the two will more likely be based on price rather than content. *Mastering Lotus Notes R5* is the more expensive of the two, but includes a CD-ROM with evaluation versions of a few applications that can be used with Notes, as well as several sample

databases to complement the sections on Notes programming.

Lotus Notes: No Experience Required only brushes past creating agents, while most of the focus is on Notes installation and troubleshooting. It includes a good glossary and index, and plenty of screenshots. Of the two books, it seems the most thought-out.

Mastering Lotus Notes R5 attempts too much by including basic development such as database creation, using the Domino Designer and the formula language. This book should really have dropped the first few chapters on basic Notes use and instead focused on basic development, if creating power users was its goal. It sits relatively uncomfortably between the option of a training course or a more advanced development book and *Lotus Notes: No Experience Required*, which is a better choice as a quick reference or beginners book.

The idea of regular users mastering Lotus Notes R5 will probably be terrifying to many Notes administrators. They spend part of their time preventing people from being able to use agents or create databases, and the rest of their time fixing dysfunctional databases that were tampered with by these people. This may be an extremist view, but many administrators are going to be reluctant to let people apply the development content of this book.

Mastering Lotus Notes R5 would be most appropriate for a person who already knows enough to make use of the programming chapters, but doesn't really need to be a developer. A better option would be to choose a book like *Lotus Notes: No Experience Required* as a basic reference, and find something with a little more bite to go further.

Ari Weisz-Koves

Mastering Lotus Notes R5

Author	Scot Haberman and Andrew Falciani
Publisher	Sybox
Distributor	Woodslane
Phone	(02) 9970 5111
Price	\$69.95
ISBN	0-7821-2185-3
Rating	★★

Lotus Notes R5: No Experience Required

Author	Rupert Clayton
Publisher	Sybox
Distributor	Woodslane
Phone	(02) 9970 5111
Price	\$39.95
ISBN	0-7821-2184-5
Rating	★★★★☆

Using Quicken Version 7 for Windows (Australian Edition)

We don't have any statistics to back this assertion up, but judging by the number of users we come across, Quicken is surely one of the most widely used home applications.

Although it was originally intended for home use, small business features have been added to Quicken and this book pays balanced attention to both areas. Transaction recording, investment management (including superannuation and downloading share prices from the Quicken Web site), budgeting and reporting are covered, along with accounts payable and receivable, payroll and cash handling. Information is also provided on using accessory items such as the Emergency Records Organiser, Financial Address Book, Workflow Manager and the Home Inventory.

Of course, some matters come down to personal preference. For example, O'Brien recommends entering transactions before they appear on bank statements, as this provides a more accurate running balance. That's true, but we find it saves time if we simultaneously enter transactions and reconcile them with the statement. This works as long as your financial habits are such that you intuitively avoid dipping into the red or going beyond your credit limit and therefore don't need an accurate running balance.

The text is clearly written and easy to follow with realistic examples, and some useful hints and explanations are sprinkled around the margins. Plenty of relevant screenshots are presented in legible sizes; their reproduction is better than those we've seen in some other recent books. The overall design is easy on the eye, and the index is useful, although it's a mystery why passing references to particular companies were indexed.

This book provides useful guidance for the beginner, but will also prove to be a valuable resource for anyone who is about to upgrade from a much older version of Quicken, and for those who want help to go beyond tracking their cheque and credit card accounts.

Stephen Withers

Author	Stephen O'Brien
Publisher	Que
Distributor	Pearson Education
Phone	(02) 9454 2319
Price	\$39.95
ISBN	0-7248-1258-X
Rating	★★★★

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Perspective: Seasons in the sun

High Noon

High Noon, an exposé on the growth of Sun Microsystems under the leadership of Scott McNealy, is one of many books to explore a Silicon Valley high-tech success story.

The book begins with the story of how four men in their twenties came together to form a company. Original founder Vinod Khosla had the vision, Andy Bechtolsheim and Bill Joy offered the technical expertise, and Scott McNealy brought manufacturing and people skills to the company. In a no-holds-barred exposé, author Karen Southwick chronicles the company's growth from its first contract, worth \$40 million (it virtually gave away machines at cost to Computervision), to the multibillion-dollar success it is today. Southwick details the power struggles and disputes, as well as the triumphs.

The focus very quickly turns to Scott McNealy, who at 29 was appointed CEO after his friend Khosla was ousted just two years after he began the company.

McNealy declined to be interviewed for the book, so the bulk of the material comes from interviews conducted with Sun employees, former employees, allies and competitors. The book also draws extensively on the work of John Barry's early book about Sun, called *Sunburst*.

The pages are filled with anecdotes, inside information and quotes from current Sun managers, executives and engineers. The author managed to get inside the organisation and absorb its culture and understand its management style, all without interviewing the CEO.

At times, Southwick crosses the fine line between presenting an inside story and her own views. A clear example of this is the conclusion, in which she speculates about Sun's continued dominance. Her advice is to back off on the Microsoft bashing, get back to basics and give customers what they need, and for McNealy to adopt a more sophisticated outlook.

As a chronicle of a CEO's role in building a company, this is not an appropriate vehicle for an author to espouse their views. Southwick praises her own work in the preface, saying the book "is both instructive and entertaining", and contains "rich, evocative detail".

Australians may find the regular use of American phrases such as "kick-ass" and "frat-boy" more than a little vexatious. However, minor criticisms such as these aside, *High Noon* is an entertaining read. It will appeal to those with an interest in the high-tech industry and offers lessons on how to cope in a chaotic, unpredictable environment.

Cathie Kennedy

Author	Karen Southwick
Publisher	John Wiley & Sons
Distributor	John Wiley & Sons
Phone	(02) 9805 1100
Price	\$39.95
ISBN	0-4712-9713-5
Rating	★★★



Microsoft: First Generation

It's often assumed that Bill Gates equals Microsoft. This is, of course, not true, but with a few notable exceptions such as Steve Ballmer, not much attention is paid to the rest of the people who make up the vast Microsoft empire. *Microsoft: First Generation* covers the careers of 12 people who joined Microsoft at its inception and were part of its ongoing operation.

If you're looking for a behind-the-scenes muckraking, look elsewhere. Although all the subjects interviewed have since moved on to other companies and projects, they're mostly pro-Microsoft. However, a lot of what they do say points to the high-pressure nature of working for

the world's largest software company. The claim on the back cover that the book covers "key" Microsoft players is a slight hyperbole. It does cover people such as Richard Brodie (who wrote the first version of Word) and Min Yee (who effectively kick-started Microsoft Press), but for the large part, these are simply hardworking people who happen to be very good at their jobs. There's very little of the visionary, and more of the heavy elbow grease.

There's a fairly heavy slant on Microsoft Press — there are histories of Russell Borland (head technical writer), Dave Neir (business operations manager), Min Yee (publisher) and Russell Steele (production manager). Clearly author Cheryl Tsang has better contacts within Press than anywhere else.

Microsoft: First Generation provides an insight into the massive company that Microsoft has become. By starting with Bob O'Rear, who wrote early versions of MS Basic and DOS, and getting a view of the proto-Microsoft, the reader gets a better appreciation of the phenomenal growth of the company and its development into dispersed functional units. There is a tendency to jump around chronologically, which some may find a little unsettling.

Don't jump into *Microsoft: First Generation* expecting a blow-by-blow history of the company — this is strictly biographical detail on some of the behind-the-scenes people who helped make Microsoft become what it is today. The reader is expected to have at least some basic knowledge of Microsoft's basic product line. *Microsoft: First Generation* does not excel in outlining Microsoft's business strategy, or in justifying its market position. Instead, it offers an insight into how people survive the Microsoft culture: by working hard, perhaps up to 365 days a year, and being ready to compete in one of the most cutthroat corporate cultures in the world.

Alex Kidman

Author	Cheryl Tsang
Publisher	John Wiley & Sons
Distributor	John Wiley & Sons
Phone	(02) 9805 1100
Price	\$39.95
ISBN	0-4713-3206-2
Rating	★★★

Take a round-the-world trip, brush up on your Spanish, hammer your keyboard or chill with the bunnies.

Around the world

Encarta Reference Suite 2000

Comprising the latest editions of the well-known Encarta encyclopedia as well as its companion atlas and dictionary, Encarta Reference Suite 2000 is an attractive bundle.

The encyclopedia's coverage is broad, though sometimes Anglocentric (see, for example, the entry for 'parliament'). It provides several routes through the material; along with a conventional search facility, there are timelines, topic trails and more. The Statistics Centre, one of several 'InterActivities', allows convenient graphical comparisons of a variety of statistics from different countries, and provides lesson plans for schools. The content appears sound, but there seems to be inconsistent use of both imperial and metric units.

The atlas starts with a view of the globe. Zoom in to an area of interest and the level of detail progressively increases. You can also follow various world tours. Virtual flights over rendered terrain give a different view of a region's topology. The atlas also provides descriptive, statistical, pictorial and audio content. It doesn't match the beauty of finely drawn maps, but it is very useful.

The dictionary includes a thesaurus and a dictionary of quotations, as well as English/French and English/German dictionaries. Spoken pronunciations are often provided, as are illustrations and sound clips. The dictionary integrates with Word and PowerPoint so you can easily check that you've used the correct word. From other applications, use the QuickShelf icon in the System Tray. We had trouble getting the dictionary to work, but the solution was in the Knowledge Base on Microsoft's Web site.



Its parental control is a flawed implementation of a reasonable idea. If a word has a taboo meaning, all of its definitions are hidden when parental control is active, though the word remains in the index if it has an acceptable meaning. Only words with solely taboo meanings are completely hidden.

Encarta Suite is an impressive product and especially good value if you can take advantage of the introductory cashback offer.

Stephen Withers

Publisher	Microsoft
Distributor	Microsoft
Phone	13 20 58
Price	\$199
Requires	Pentium 90, Windows 95/98/NT 4.0, 24M RAM (32M for NT), 155M hard disk space, 4x CD-ROM drive, soundcard

Rating ★★★★★

Quickstudy Spanish

The aim of this language package is to teach you *some* Spanish in a very short time so that you can get the most out of your trip to a Spanish-speaking country. Quickstudy Spanish is really geared towards Americans going abroad for the first time. A very cheesy American 'personal tutor' named Ashley shows you around and explains everything to put you at ease.

There are three main areas to explore: the Language Lab, Conversation Lab and Game Room. There is also a dictionary and a grammar reference, so while no grammar is taught in the actual exercises, it's there in index form if you want to know something.

The Language Lab exercises are all about vocabulary, situations and communication. The situations are dialogue between two actors using vocabulary from the previous lesson. In the Conversation Lab, your ability to communicate is tested by an actor and you reply using a microphone and your best accent. If you want a question repeated you say 'Perdone?'

In the Game Room you can finally get the Spanish lyrics and English translations to well-known Spanish songs like 'La Bamba' and 'La Cucaracha'. Conquest is



a strategy game that helps build your vocabulary, and Video Match tests your comprehension in a version of Memory.

Quickstudy Spanish is effective as an introduction to Spanish, and it allows you to become accustomed to listening to and trying to communicate in Spanish. It is recommended, especially for newcomers to language studies.

Michele Roach

Publisher	The Learning Company
Distributor	Roadshow Interactive
Phone	(02) 9552 8600
Price	\$49.95
Requires	486DX/66, Windows 95/98, 8M RAM (16M recommended), 2x CD-ROM drive, 256-colour SVGA, soundcard, microphone, speakers

Rating ★★★★★

Tonka Workshop CD-ROM Playset

Tonka toys are so renowned for their durability and resistance to a toddler's joyous capacity for destruction that the company adopted the motto 'Tonka-tough' from loyal consumers. They made the kind of toys you could ride down the driveway, smash into a wall repeatedly, roll off a cliff top, and still be able to pass it on to your younger siblings to continue the tradition.

With a history like that it's difficult, nay frightening, to imagine Tonka taking its brand of fun to the fragile world inside your computer room, but by partnering with Hasbro Interactive to produce the Tonka Workshop CD-ROM Playset it has managed to do just that.



Tonka Workshop combines interactive software with a toy console that sits on your keyboard to introduce an element of physical play to what would normally be a purely intellectual interactive experience. The console gives kids physical tools to operate the virtual tools they encounter in the interactive workshop. Tonka Workshop's unique strategy for giving children control over the PC makes it very simple to use. Tonka Joe, a do-it-yourself action hero, guides the child throughout the interactive presentation and an onscreen display indicates which tool or button should be activated at each stage.

The interactive presentation offers kids the choice to explore all sorts of building scenarios from simple construction exercises to a mildly immersive handyman adventure in the Tonka Workshop van. Each exercise is designed to help children develop logic skills, acquaint themselves with basic mechanical concepts and develop their dexterity. For a toy that may sound a bit dry, there are plenty of weird contraptions to keep kids entertained, and they'll have plenty of fun using all the tools and gadgets on the console.

If you thought that tailoring toys for a particular gender went out of fashion with cigars outside the delivery room, think again. Tonka's marketing information boldly states that Tonka Workshop is targeted at boys aged three and up (the upper age bracket being about six). We'll let you judge Tonka's political correctness, but gender issues aside, Tonka Workshop is a novel and well-designed interactive toy.

Andrew Colley

Publisher	Hasbro Interactive
Distributor	Hasbro Interactive
Phone	(02) 9953 8788
Price	\$79.95
Requires	Pentium 90, Windows 95, 16M RAM, 2x CD-ROM drive, SVGA capable of 8-bit colour, soundcard
Rating	★★★

Reader Rabbit Playtime for Baby

The attractive thing about this title is its claim that the software is suitable for ages nine to 24 months. Nine months? Won't the unfortunate infant fall off the chair?

When you first load the CD, you are confronted by a somewhat annoying American 'mother' who presents Playtime for Baby with reassuring suggestions such as, "Be careful to keep one arm around your baby at all times". Phew.

"Your baby's enjoyment and success in this program depends on your involvement." Aha, so that's the idea. Unfortunately there was no nine-month-old in the office on the day of testing, but we were given loan of an 18-month-old future programmer.

Fortunately, American Mom doesn't appear again, so the hosting is left to Reader Rabbit's pal, Mat the mouse. All the activities are very bright and colourful and full of loud noises, from farm animals to percussion instruments. The software

certainly delivers on the interactive, potential learning front. But does it hold a baby's, or in this case, toddler's attention?

Well, no. No matter how much we pointed, clapped and cooed, Lucie was far more interested in playing with the mobile phone, which was nearby, and just about everything else on the desk other than the computer screen. Oh well, as the presenter says, if you find that your baby isn't interested, wait a few months and try again.

In the meantime, toddlers will no doubt enjoy the second CD in the pack more, as it contains 17 additional songs.

Lindsay Hayman

Publisher	The Learning Company
Distributor	Roadshow Interactive
Phone	(02) 9552 8700
Price	\$49.95
Requires	Pentium 75, Windows 95/98, 16M RAM, 20M hard disk space, 2x CD-ROM drive, video card, soundcard
Rating	★★★

Interactive News

- The Universal Serial Bus (USB) system — the plug and play serial bus standard designed to revolutionise PC hardware installation and use — is getting a makeover, as revealed at the recent USB Developers Conference in the United States. USB 2.0 will purportedly allow transfer speeds of up to 480Mbps, which is more than 40 times that of the current USB maximum of 12Mbps. The USB Promoter Group are hoping that USB 2.0 will challenge existing high-bandwidth interface mediums, like SCSI adaptors. The standard will also be backward-compatible with earlier (and current) versions of USB, ensuring current USB hardware won't become obsolete. USB 2.0 will be introduced during the first half of 2000, and compliant hardware is set to follow soon after.
- The portable digital music player (PDMP) market is currently booming. On the back of the recent release of the Diamond Rio 500 (its primary feature being expanded data capacity), Creative Labs has announced its next entry in the PDMP market, the Nomad II player. Including a host of unique features — like USB connectivity, voice recording

and an FM radio tuner — the Nomad II also supports reprogrammability. This feature gives the Nomad II added versatility and future support for other audio formats (on top of the existing MP3 standard) as they become available. Updates will implemented via downloadable firmware extensions.

In other news, SanDisk has recently signed with Toshiba to develop gigabit technology for the flashcard medium, to be used in digital devices such as PDMPs and cameras.

● It may seem a little far-fetched to most, but one small hardware developer thinks that the world's almost ready for fully functional automobile computing. The current prototype model of the KarPC (by KarPC) — featuring a 6in LCD screen, soft-touch interface buttons (an optional mini-keyboard is in the works) and a CD-ROM drive — has been designed to fit into the dashboard of the car. It can supposedly be installed almost anywhere else in a vehicle. Although the KarPC would be welcome company in traffic jams, it remains to be seen whether or not the device will be approved by vehicle safety authorities.

Art Mitchell



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Sequels and clones

Legacy of Kain: Soul Reaver

Soul Reaver, the sequel to the 1996 console port Blood Omen: Legacy of Kain, is a very different beast to its predecessor. Focusing less on RPG elements, Soul Reaver picks up events more than a thousand years after Kain's ascension.

This time, instead of playing Kain, you play a character hell-bent on his destruction, Raziel, a former lieutenant of Kain. Cast into a kind of hell for having the gall to grow wings before your master, you are resurrected by a being known as the elder god who charges you with destroying your former master and his servants.

Soul Reaver is definitely a member of the Tomb Raider genre, although it is somewhat fresher than many titles of its ilk. The plot is great, the voice acting superb, the graphics are excellent — a little better on the PC version than on the PlayStation version — and the environment design is first-class. There are no levels per se, and no loading screens; instead it's all one big environment. A gamepad is recommended for this game, as there are a lot of keyboard controls to master. This is not a game for those without serious keyboard coordination (think Die by the Sword).



Soul Reaver is not just a matter of beating the stuffing out of your enemies. Some of them are vampires, so you have to kill them in inventive ways: hurl them onto spikes, into fires or rivers, or cast them into the sunlight. Later, you get a sword that helps you in your task. It's quite a twist on the standard action fare, and the animations are fantastic. Although after you've staked the gazillionth vampire, you realise that it's actually more efficient just to jump over them because when you kill them, you know they will have respawned by the time you return to the area.

It does sometimes get a little frustrating, and you're constantly retracing your steps, looking for the right path to go down next. Then there's endless block puzzles reminiscent of Tomb Raider, and the 'jump over crevice' challenges that require you to run for miles back to the starting point if you miss one of the tiny platforms you're meant to land on become a bit much. After repeated attempts, you're not real keen to do it again.

These criticisms aside, it's a very fine game. It is quite fun apart from the frustrating bits and the disappointing ending. You've been warned.

Nathan Taylor

Distributor	Ozisoft
Phone	(02) 9317 0000
Online	http://www.eidosinteractive.com/legacyofkain/
Price	\$89.95
Requires	Pentium 200, Windows 95/98, 16M RAM, 320M hard disk space, Direct3D video card, 4x CD-ROM drive
Classification	MA (15+)
Rating	★★★★

Force 21

The influence of Tom Clancy is clear in all the games from Red Storm Entertainment — hardly surprising when you consider he is a company founder. Although Force 21 doesn't draw directly from any of his books (unlike Rainbow Six, for example), it still occupies familiar Clancy territory.

The year is 2015 and expansionist moves by China into neutral Kazakhstan



precipitate a war with its superpower rival, the US. The game unfolds via a linear campaign in which you fight for supremacy on either the American or Chinese side.

Like Rainbow Six, each mission is prefaced with a detailed intelligence briefing. This is followed by a setup screen listing the vehicles pre-assigned to the mission and the platoon commanders from which you choose. You then proceed to the meat of the game: the 3D combat phase.

First impressions of Force 21 are good. The environments are atmospherically modelled, sound effects (including troop voice-overs) are realistic and the 3D graphics, although spartan, are attractive. The game is tactical, rather than strategic, and rewards careful consideration of factors like topography, assault speed and platoon formation.

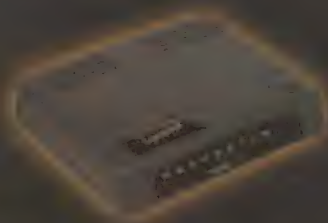
This is not a realistic war game, however. Vehicles have an unlimited supply of ammunition, there is no infantry, and the simulation of vehicles — tanks, in particular — are rudimentary. You don't get to choose the vehicles for each mission, nor can you rearrange the platoons until you have entered the combat phase, by which time the enemy may be all over you.

Perhaps the most frustrating aspect of this game is the dreadful pathfinding AI.

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Games News

● Microsoft's latest version of the DirectX Application Programmer's Interface (API) — a set of advanced multimedia system instructions used by software (in particular games) to interface with computer hardware — has finally been released. DirectX 7.0 contains a number of new features, namely better network support for multiplayer gaming, an extended sound sample suite and increased support for peripherals. As with DirectX 6.0, Microsoft has focused improvements on the Direct3D component of the API, improving 3D graphics acceleration capabilities.

Benefits will be most apparent in software optimised for DirectX 7.0, but a general installation of the API will mark a humble performance increase with software utilising the DirectX API — especially for those using 3D graphics acceleration.

● Blizzard Entertainment (developers of best-selling PC titles Diablo and StarCraft) announced at this year's ECTS games expo in London that Warcraft III — sequel to the multi-award winning and highly regarded real time strategy game Warcraft II: Orcs & Humans — was in the advanced stages of development. In a move that has surprised many, Blizzard revealed that Warcraft III is to be Blizzard's first role-playing strategy game, as opposed to being an RTS effort, as

expected. Using a full 3D engine, Warcraft III takes the basic elements made popular by the series (resource, building and squad management) and reduces the scale a notch. Players now manage only a handful of units and will be encouraged to develop the skills and strengths of 'hero' units within the party as the adventure progresses. Gone are the 'battle maps' of old. Warcraft III will instead feature a large landscape complete with non-player character populated towns to traverse and battle in. There will also be side quests much like those seen in Diablo. Here's to another round of sleepless nights battling poorly-groomed Orcs! Zug-zug!

● On the topic of games exhibitions, Australia's getting its first local taste of these sensory-overloading events, in the form of the Australian Competition Games Expo (ACGE). Based on the E3 (US) and ECTS (UK) models — where the industry hires a suburb for a few days and crams in an entire year's worth of upcoming gaming-related wares for display — the ACGE will be held at Homebush Bay in Sydney in March 2000. The expo will feature industry members from around the world, as well as plenty of home-grown content. All those games under one roof? We'll see you there!

Gamespy

Units frequently bog down when you change the formation or orientation of platoons and they frequently experience difficulties negotiating features like trees or buildings.

Notwithstanding these problems, Force 21 can be fun, especially in multiplayer mode. You just shouldn't expect a hard-core simulation of conventional land-based warfare.

Jon Gill

Distributor	Jack Of All Games
Phone	(03) 9934 5530
Online	http://www.redstorm.com/force21/
Price	\$89.95
Requires	Pentium 200, Windows 95/98, 64M RAM, 150M hard disk space, 4x CD-ROM drive, Direct3D video card recommended
Classification	G (8+)
Rating	★★★

Starfleet Command

There have been previous attempts to bring board games to a computer audience, and some of them worked, and some didn't. However, it's much trickier to bring strategy-style board games with a dash of role-playing to a computer audience; it involves balancing the numbers against the action. Starfleet Command is loosely based on Star Fleet Battles, a game system that relies heavily on stats and careful planning.

Does it transfer well to the computer medium? Not really. This is largely due to the fairly difficult task of controlling the interface, rather than the strategy element. In Starfleet Command you take control of a species fleet along Star Trek lines — Federation, Klingon, that sort of thing — and engage in battles with opposing fleets. There is some semblance of a plot. Orders come in thick and fast from your respective empires, but when it comes

down to it, playing Starfleet Command successfully depends on careful strategy in attacking opposing ships.

Starfleet Command is let down by its interface. Onscreen icons are small and hard to make out, and the last thing you want to do when staring a photon torpedo in the face is forget which icon controls the shields. Matters aren't helped by the fact that when you think you're ready to fire weapons and pounce on the enemy, you find that your shields are using up all the available energy.

It's a pity that the controls are so unwieldy, because Starfleet Command looks great. There's lots of realistic space to play with, and although the ship models are fairly simple, they scale and move well. Starfleet Command may look good, but there are plenty of better strategy titles.

Alex Kidman

Distributor	Roadshow
Phone	(02) 9552 8700
Online	http://www.interplay.com/
Price	\$89.95
Requires	Pentium 200, 32M RAM, 250M hard disk space, 4X CD-ROM drive
Classification	G
Rating	★★

Street Wars: Constructor Underworld

"So, kid, you still wanna be a Godfather huh? Ya still training with Gangsters from Eidos? What's that? The controls were too complicated, the actual game too hard, and basically you didn't have much fun? Well, kid, killings, extortion and mugging's ain't exactly what I'd call enjoyable — but here's a game which might make things a little more interesting for you."

Street Wars, from Studio 3, has all you would expect from a 1920s mobster-style game — extortion, police bribes and drinking dens, as well as real time strategy elements such as resource management and breeding of workers. The aim is to become a Godfather by building up your empire and expanding into other territories. Obviously, it's not that easy — remember, the heart of any gangster's game is doing battle with rival gangs, stealing tenants from other areas and persuading the police to look elsewhere.

Things often get quite complex in these games, and one of Gangster's main downfall is its complicated controls and options. Thankfully, Street Wars has an easy-to-use tutorial at the outset of the

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game, which sees the Godfather guiding you through your early missions.

It is clear that Street Wars is different from other games in this genre. Breaking away from the usually serious mood of other such games, Street Wars takes a humorous approach. All the characters have stereotypical hoodlum personalities, and the cartoon-style graphics add to the tongue-in-cheek attitude that makes Street Wars so refreshing.

If you want to be part of the gangster era but have found previous games too complicated, then Street Wars is for you. With its black humour and sufficient level of difficulty, Street Wars should keep you entertained for some time.

"So, that's about it, kid. Just remember, don't cross the Godfather kid, or you'll be wearin' a nice new pair of concrete boots. Got that?"

Alan Crawford

Distributor	GT Interactive
Phone	(02) 9902 3073
Online	http://www.streetwars.com/
Price	\$89.95
Requires	Pentium 200, 32M RAM 8x CD-ROM drive, 2M PCI video card
Classification	M (15+)
Rating	★★★☆

Darkstone

It's impossible to review Darkstone without mentioning the Diablo, Blizzard's classic 1997 action role-playing game to which this game clearly pays homage.

The basic format is the same; create your character, explore dungeons, kill monsters, gather booty and experience, improve your character, explore deeper dungeons and so on until the final showdown with the evil uber-baddy. Throw in all manner of weaponry, armour and magical tools, and a bunch of quests to keep you occupied along the way, and you have an amazingly addictive game.

Like Diablo, the dungeons are randomly generated for each campaign, so the replayability value is exceptional. There are more levels to explore in Darkstone, and more quests as well; some are unrelated to the main storyline, others are critical to the successful conclusion of the game. The story itself is traditional fantasy fare — you must recover seven crystals that make up the Time Orb, a magical device that gives you the power to crush Draak, the evil priest-turned-dragon.

Similarities with Diablo abound: town-based NPCs that provide healing and other services; the use of potions to maintain health and mana; a dungeon overlay map showing you where you've been; barrels that explode when you crack them open; and magic portals to transport you

between town and dungeon. Multiplayer mode is available, but the absence of a free server like Blizzard's battle.net means it is harder to find a game.

There are enough subtle enhancements, however, to make Darkstone compelling in its own right. The 3D game has an intuitive and easy-to-use camera view. You can also play with two characters at a time.

If you liked Diablo and can't wait for its oft-delayed sequel, then buy this game.

Jon Gill

Distributor	Jack of all Games
Phone	(03) 9934-5530
Online	http://www.delphinesoft.com/darkstone/
Price	\$89.95
Requires	Pentium 266, Windows 95/98, 64M RAM, 8x CD-ROM drive, 3D video card
Classification	MA (15+)
Rating	★★★★



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Love at first site

Catch

Catch claims to be more than just a conventional online dating or match-making service. Sure, you *could* meet the partner of your dreams or your lifelong soulmate, but chances are you probably won't. Catch's Web site, "the social centre for the Catch community", is also intended to be a casual social meeting place of the virtual kind. In other words, Catch is a forum where social victims of the digital age can connect with each other (no pun intended), chat online, seek out a penpal, hook up with a golf buddy, find a travel companion or participate in a forum.

You have two choices when using Catch. You can enter the site as a guest and peruse the profiles of Catch's distinguished list of dateables, or register online as a member to "access the larger community of interesting people". If you're not convinced by this, Catch offers a free seven-day membership scheme to entice reluctant romantics as a kind of 'try before you buy' service.

Although money can't buy you love, you do have to pay for the privilege of online dating. Catch's service is relatively inexpensive, ranging from \$10 for a one-month membership to \$95 for a 12-month subscription. This is a real bargain when you consider that for the price of a romantic dinner for two, a bottle of wine and a couple of movie tickets, you get access to an endless array of potential suitors.

Once you're a member all you have to do to 'catch' yourself a date is fill in a member profile detailing personal information (the make of car you drive),

basic interests (the radio station you listen to) and personality traits (your propensity to talk to strangers) and submit a search. There are three different search types to choose from — alias, quick or full — and performing a search is an exercise in picking your perfect partner. If your search reveals any matches, it's up to you to initiate communication with either an eCard or eThread.

Catch uses a Jungian-style questionnaire to generate scores and determine your compatibility with others. Although this may seem like a theoretically sound way to find a suitable partner, the crude profiles tell you little about the person you've been matched with, and after you've read enough profiles, it becomes difficult to distinguish between them.

If you think Catch could be the answer to your dating prayers, think again. A quick search based on my *modest* criteria revealed 32 matches, and among the names were Dionysus, RealRomantic, RUthelForME, Uteman, BigBadBen and The Hobbit. Promising indeed. A full search proved even less fruitful because the search timed out, but I guess that's better than the "Sorry, no matches" message I initially received.

Catch is a good way to ease yourself into the electronic dating scene without experiencing any serious personal trauma or grievous bodily harm. It guarantees your privacy through a secure system; you decide if and when to reveal your identity to other members. This means you can socialise in an environment that is casual and non-threatening, and devoid of any of the pressures you might face in a live dating situation.

The delays experienced when using Catch, coupled with its dubious slogan — "The online meeting place for real-life people" (is there any other kind?) — do little to inspire the lovelorn's confidence in the service. Catch is a nifty concept, but give me the real world dating experience any day!

Vanessa Fazzino

Online
Rating

<http://www.catch.com.au/>
★★★



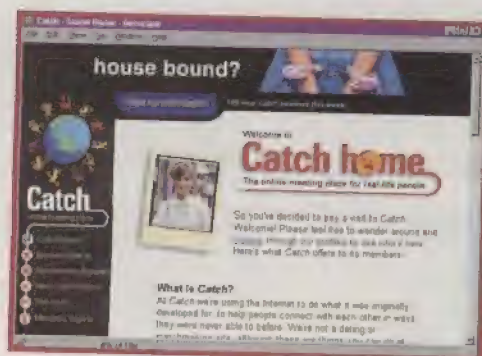
RSVP

Try this simple test. It's early on a Friday night and you're curled up in bed reading APC. Look to your right. The only thing lying next to you is the latest issue of the *Linux Pocketbook*, and you can't wait for Saturday evening, which you've set aside in your diary to install Red Hat 6. Are you nodding your head furiously? Then I think it's time to RSVP.

RSVP is an online dating site, which claims to be Australia's largest singles site. Membership to RSVP is free. The first step is to set up your own profile, starting with a codename. The profile is a short personal description that lets other members find you. If you're initially unsure about registering with RSVP, then you can enter as a guest. Using guest entry, you can search the database of RSVP members for a compatible person. RSVP is not limited to Australia — members can be from any country in the world.

To contact another member, you must buy a book of e-stamps. Starting price for a book of 10 is \$9.95, and as the site says, it's cheaper than a movie or a couple of drinks at the bar. Once you've contacted someone, you can get to know them anonymously before you need to give out any personal details. RSVP membership includes some great features, such as a voicemail service which allows you to add your voice to your profile. There is also an events section, which lists gatherings of other RSVP members, and you're invited!

RSVP is a great way to meet new friends, and who knows, maybe spark



some romance. It opens the world to your home. OK, so you've arranged the date. Now to order the pizza and video online. There may be time for a quick perusal of the *Linux Pocketbook* while you wait for everything to arrive. Some people will never learn.

Andrew Broadhead

Online <http://www.rsvp.com.au/>
Rating ★★★

Match Maker

Move over Dexter, 'Perfect Match' in the '90s has gone online — sans Greg Evans and blonde bombshell sidekick, of course!

Becoming a contestant on Match Maker is as easy as filling in a three-part questionnaire that comprises a personal profile, an 'in your own words'-style essay and a profile of your ideal partner.

There are then several ways you can go about playing the online dating game. You can join as a member and simply wait for others to make contact with you, jump right in and make the first move or let Match Maker's 'Dexter' find you a perfect match based on your 'ideal partner' profile.

Once you've visited a few Internet dating sites, it's not hard to figure out that they operate in a fairly stock-standard way, give or take a few refinements. Although Match Maker has yet to break the boundaries of the online dating genre, this site does it slightly better than the rest that we've seen.

Match Maker boasts services that make personal ads and dating agencies look like relics from a prehistoric age, including public and private chat rooms where you can rendezvous with partners in real time, an efficient email delivery and notification system, and a free photo-scanning service for those who think including a photo with their profile will boost their 'pull' power.

Surfbaud: Silicon dating

The first written or drawn form of human communication may not have been information about hunting grounds or religious imagery, but a personal ad. A mark on a rock inviting someone to meet them there again when the moon is full. People aren't only hunters and gatherers, they're also socialisers. Tribal societies have always had strong taboos against marrying inside social groups, and writing is a way of communicating an idea to people outside the group that you normally converse with. Anyone who has ever used a public toilet will know that the 'personal ad' style of rock art is still alive today.

The 20th century has seen the emergence of personal ads and dating agencies, as people seek out new ways to meet others outside their existing circles of friends and workmates. Personal ads allow people to select a potential date for themselves, by reading through the list of ads or writing their own. The ads are written in a code that quickly becomes familiar to lonely hearts, and people can be quite creative when writing their own descriptions. They can spell out their interests, what they are looking for — a companion, casual date, lover or spouse — using just a few mysterious acronyms.

Dating agencies, on the other hand, appeal to the professional class by doing the selection for them, in exchange for a fee. To register with an agency, you usually have to complete a

detailed questionnaire on your occupation, interests and idea of a suitable partner. Agencies often differentiate themselves with their own unique theory of compatibility. These theories can be drawn from astrology, numerology, popular psychology, pseudo-science, or a combination of such theories. Dating agencies have also seen the potential in new technologies — who can forget the video dating agencies of the '80s?

Internet dating sites combine elements of both personal ads and dating agencies. You can usually browse through the sites' list of eligibles for free, but if you want further assistance, you have to pay for it. Online personal ads have the advantage of being easily searched, and you can quickly make contact if you like someone's entry. However, if you want the site to do the looking for you, you'll still have to fill out a more detailed questionnaire.

Of course, dating sites are not the only places people meet online. We've all heard the urban myths about couples who met online and flew across the world to marry each other without ever having met in person. These stories are always based on chat groups and email, not dating sites. Part of the thrill of meeting someone in a chat room is their anonymity; you have no way of knowing the truth of what the other person reveals about themselves. Then again, haven't relationships always been like that?

Glenn Phillips

The site is animated and extremely well designed, but its attempts to add a romantic touch — pulsating love hearts, pouting lips that blow kisses and red roses that bloom in real time — have only ended up making the site look like an '80s Hallmark greeting card.

Match Maker's only serious flaw is that, unlike other sites, it doesn't allow you to browse its members database unless you commit to membership. The upside to this is that it offers a free one-month trial membership for the first 1,000 people that join the service, as well as the option of half-price membership for anyone who wants to become a full member.

With its strong emphasis on a professional service, Match Maker

does take a little of the fun and light-heartedness out of online dating, and as such would suit those more serious and discerning romantics who are looking for genuine relationship opportunities.

Match Maker is an Australian owned and operated site, and member feedback posted on the site would suggest that it is one of Australia's premier Internet dating sites (although there isn't a romantic getaway to Vanuatu awaiting you when you've met your match). It seems Dexter's days of 'perfect matching' are well and truly over.

Vanessa Fazzino

Online <http://www.matchmaker.com.au/>
Rating ★★★★★



'Tis the season to mutilate rubber cows. Just ask Gateway.

Chip Chat's Cow Chop



PC company Gateway caused great amusement in the Chip Chat offices when it sent out a letter recalling its famous rubber stress cows. Apparently, there's a slight risk that they'll tear, presenting a choking risk to children. Being a rational being, Chip Chat decided to scientifically test this assertion.



'Stress cows' are designed to provide the kind of stress relief pictured here. We're not sure what this says about human beings, but our hand model certainly felt much better afterwards. As the illustration below confirms, however, the cow did in fact feel somewhat worse.

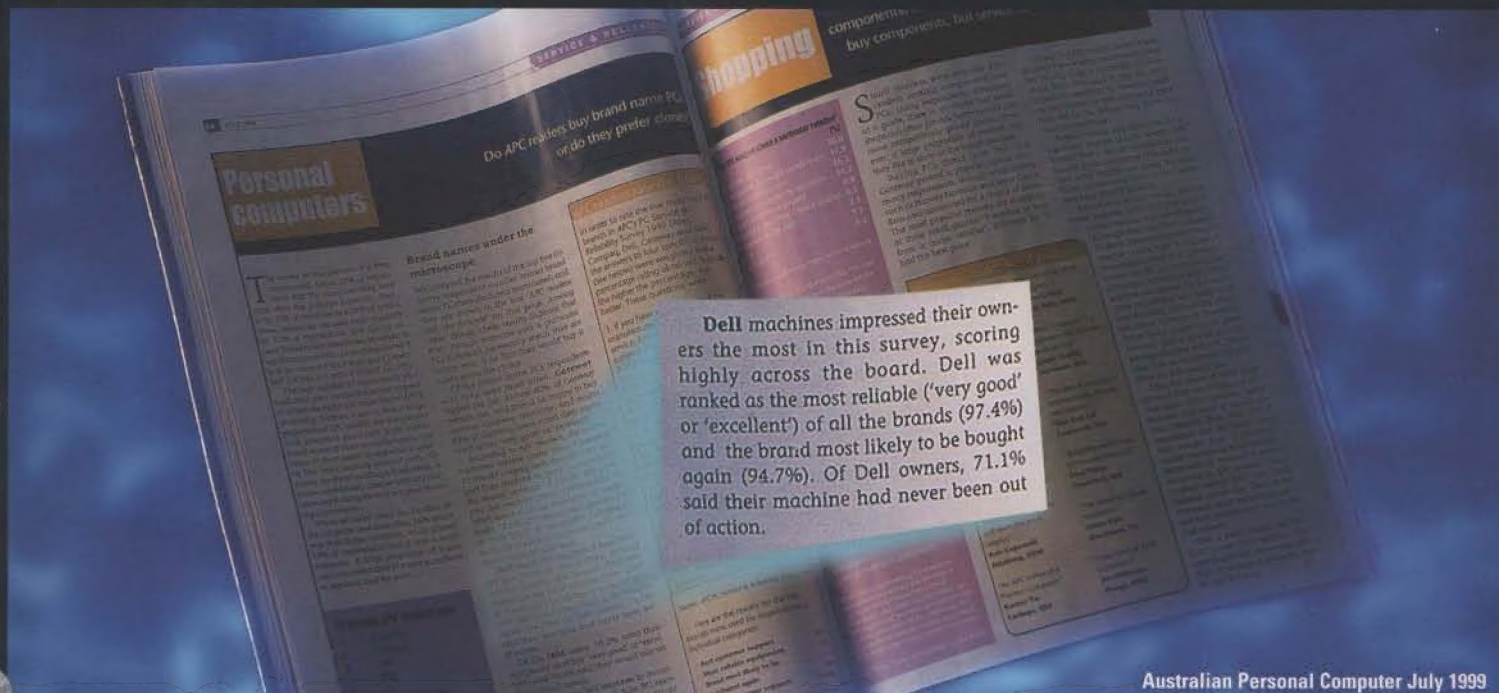


But don't panic! As the picture at right demonstrates, even a badly torn stress cow can easily be fixed using equipment found in any home. Compare the damaged cow on the left with the unblemished cow (right). We challenge you to spot the difference! So don't return your cows to Gateway; just grab a roll of sticky tape and let 'em rip!



Chip Chat will return to something like its normal form next month. Or perhaps not.

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